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requires *a certain continuous solution of the sheathing metal,* in view of the present enormous consumption, this subject has economical bearings of great importance. It is probable that an alloy, forming part of a mixed metal, might be found, less positive in its relation than the one removed from yellow-metal, and yet sufficiently oxidizable to preserve the surface clean while the vessel is in motion. Such an alloy united to brass would present the mechanical requirements, in union with a chemical resistance called for, in sheathing metals."

Professor W. B. Rogers gave an account of his experiments on the production of sounds by flames within glass tubes, and explained the principle of their formation.

Professor Felton alluded to the newly discovered process of Photo-lithography, which had been announced to the Academy by Dr. W. F. Channing at the previous meeting, and suggested that it offered an admirable method for the reproduction of the inscription on an ancient papyrus in Dr. Abbot's Egyptian collection. He had spoken to the inventors of the process, and the plan of reproducing it in this way seemed to them quite practicable. If it could be done, this would be the second inscription of that kind which had ever been published.

Dr. Channing said he had no doubt the inscription could be lithographed by this process at a moderate cost, and moved that the Publishing Committee take into consideration the expediency of thus bringing before the scientific world this interesting papyrus. The motion was seconded by Professor Felton, and adopted. Dr. Channing was added to the committee for this purpose.

Four hundred and fiftieth meeting.

April 13, 1858. — MONTHLY MEETING.

The Academy met at the house of Hon. C. F. Adams.

The PRESIDENT in the chair.

A letter was read from Mr. John Akhurst, of Brooklyn, N.Y., dated March 30, offering to forward to the Academy certain publications of European Societies, addressed to the Academy, which had come into his possession at a custom-house sale, on payment of certain charges. Also a letter from the Librarian of the University Library, Cambridge, England, February 3, 1858, acknowledging the receipt of the Academy's publications.

Professor Lovering, for the Committee on Meteorological Observations, read the following report: —

"At a meeting of the Academy on the 27th of May, 1856, Dr. B. A. Gould, Jr. offered some remarks on the difficulties which meteorologists (particularly in Europe) find in obtaining meteorological observations made in Boston and its vicinity. Whereupon it was voted that Professor D. Treadwell, Professor Lovering, and Mr. Jonathan Hall be a committee to take the subject into consideration. During the long period which has elapsed since their appointment, this committee have not lost sight of this subject. After carefully examining the materials at their disposal, they have begun with the publication of Mr. Jonathan Hall's observations on the thermometer, made at No. 51 Hancock Street, Boston, since January 1, 1821. These observations, made three times a day, with scarcely a single interruption, and continued down to the present time, have been published for a period of thirty-six years, ending with January 1, 1857; together with observations on the quantity of rain which has fallen since 1823, or during a period of thirty-four years. This publication fills eighty of the quarto pages of the Memoirs, and terminates with tables which show the mean heat of each year, and the mean heat of each month, for thirty-six years; also, the mean heat of the whole period: the same *means* also for the three particular hours of the day at which the observations were taken.

"The committee propose, with the approbation of the Academy, to publish next the meteorological observations of the late Dr. Enoch Hale. Dr. Hale's observations on the thermometer, winds, and clouds began January 1, 1818, and ended December 31, 1848, covering a period of thirty-one years. His observations on the barometer began December 1, 1818, and ended December 13, 1848, extending over a period of thirty years and a few days. The publication of these observations is due, not only to the cause of science, but also to the memory of Dr. Hale, who was recognized by the Academy as its meteorological observer, and who was encouraged to continue and improve his observations by its aid and advice."

On motion of Professor Gray, it was voted that the report be accepted, and that the committee be requested to continue their labors.

On motion of Mr. G. B. Emerson, it was voted that the subject of the preservation of the meteorological papers of the Academy be referred to the same committee.

The Publishing Committee, to whom had been referred the subject of publishing a photo-lithographic copy of the papyrus in Dr. Abbot's Egyptian Museum, reported progress, giving details of the probable extent and expense of the work. Professor Lovering stated that it was Professor Felton's wish that the publication might be postponed, as he expected to be absent from the country during the coming summer.

Professor W. B. Rogers addressed the Academy on the efflux of gases from a cylindrical orifice. He stated that the fluid escaped in the form of rings, each section of the ring revolving in its own plane.

Professor Jeffries Wyman referred to certain experiments he had made, to ascertain the nature of the impression made by falling masses of water on plastic clay. He found that, in falling, the drops became rings, the section revolving inwards and upwards in its own plane, as indicated by the impression in the clay, its inner edge being higher than the outer, and marked by converging lines.

Professor Rogers explained the method by which this phenomenon resulted, as he thought, from the mechanical forces called into operation.

Professor Gray then presented the following communication: —

Notes upon some Rubiaceæ, collected in the United States South-Sea Exploring Expedition under Captain Wilkes, with Characters of New Species, &c.

1. *Timonius, Bobea, and some other Guettardeæ.*

THESE two genera were confused by De Candolle, and have not been satisfactorily cleared up by Korthals, who occupied himself with them several years ago, nor by Miquel, who, in his Flora of Netherlands

India, has followed Korthals' steps. For the information which enables me to fix their synonymy, and give their true characters, I am indebted to the Nestor of our science, Robert Brown. Nearly half a century ago, this most sagacious and conscientious botanist had identified with *Timonius* of Rumphius a plant collected by Sir Joseph Banks at Endeavor River, and by himself on the same coast of tropical Australia; and in the Banksian herbarium he had referred the *Erithalis* of Forster (not of Linnæus) to the same genus. An allied plant of the Sandwich Islands (the type of Gaudichaud's genus *Bobea*) was also known to Mr. Brown, and suspected to be not congeneric with *Timonius*.

Desfontaines, in the year 1820, established his genus *Polyphragmon* upon the original *Timonius*.

In 1829, Chamisso and Schlechtendal published in the Linnæa their genus *Burneya*, founding it upon Forster's *Erithalis*, and adding the Sandwich Island plant, with some doubt, as a second species.

Still earlier, however, Gaudichaud had issued his plate of the latter plant, founding on it his genus *Bobea;* but his volume of letter-press, although it bears the date of 1826, was not published until 1830.

In that year De Candolle published the fourth volume of the Prodromus. Adopting, in place of *Burneya*, the name of *Timonius*, — probably from the Banksian herbarium, — he followed Chamisso and Schlectendal in referring the Sandwich Island plant and Forster's *Erithalis* to the same genus, but took the carpological characters wholly from the former. That he had no idea of the fruit of the latter, and that he had not in fact recognized the *Timonius* of Rumphius, appears from his having referred the fruit of Forster's plant, as figured by the younger Gærtner, to another genus, viz. the *Polyphragmon* of Desfontaines, which is pretty clearly the original *Timonius*.

More recently (in 1849?) Korthals undertook to elucidate these plants. But he wrongly describes the internal structure of the seed; he refers the original *Timonius* to *Polyphragmon*, instead of *Polyphragmon* to it; he divides congeneric species between his *Bobea* and *Polyphragmon* ; and, finally, he had not the means of knowing the leading character of Gaudichaud's genus *Bobea*, i. e. the imbricative æstivation of the corolla.

Lastly, Miquel follows Korthals implicitly; but in his addenda to *Rubiaceæ* (Fl. Ind. Bat. 2, p. 355), he states that the fruit of *Bobea* is the same in structure as *Polyphragmon*. Still the fact that the fruit of the original *Bobea* is figured and described quite otherwise does not arrest his attention nor suggest the true state of the case.

Korthals should have the credit of rightly making out the character of the singular plug which occupies the summit of the pyrenæ of the fruit in these plants; but he apparently was not aware that A. Richard had remarked the same thing in *Guettarda*, and rightly understood it. It is, in fact, a general Guettardæous character, as also is the exalbuminous seed, now first made known.

The amended characters, and the synonymy of the two genera in question, are subjoined, with the diagnoses of some new species.

TIMONIUS, *Rumph.*

Flores polygami. Calycis limbus cupuliformis persistens. Corolla hypocraterimorpha, intus nuda, lobis 4 – 10 æstivatione valvatis. Stamina tubo inserta; filamentis brevissimis. Stylus apice 5 – 10-fidus, lobis subulatis inæqualibus intus stigmatosis. Ovarium pluriseriatim multiloculare. Ovula in loculis solitaria, funiculo brevissimo cupuliformi suspensa. Drupa polypyrena; pyrenis numerosissimis angustis circa axim elongatam imbricatim et multiseriatim superpositis, putamine apice pervio funiculo seminis strophiolæformi (obturamenti suberosi instar) clauso. Semen lineare vel oblongum: albumen vix ullum. Embryo semini conformis, cylindricus; cotyledonibus radicula multo brevioribus. — Arbores vel frutices, stipulis interpetiolaribus perulatis vernatione convolutis mox caducis; foliis coriaceis, venulis (pagina superiore præsertim) sæpius tenuissime et creberrime reticulatis; pedunculis axillaribus uni - plurifloris.

Timonius *Rumph. Herb. Amboin.* 3, *p.* 216, *t.* 140; *R. Brown in Herb. Banks & Mss. Ann.* 1810.
Porocarpus, *Gærtn. Fruct.* 2, *p.* 473, *t.* 178.
Erithalis, *Forst. Prodr.; Gærtn. f. Suppl. p.* 92, *t.* 196, non *Linn.*
Polyphragmon, *Desf. in Mem. Mus. Par.* 6, *p.* 6, *t.* 2; *A. Rich. Mem. Rub. p.* 151.
Burneya, *Cham. & Schlecht. in Linnæa,* 4, *p.* 189, excl. sp. *No.* 2.
Timonius (excl. sp. & char.) & Polyphragmon, *DC. Prodr.* 4, *p.* 445, 461.
Bobea (excl. syn. Gaud.) & Polyphragmon, *Korthals in Neder. Kruidk. Arch.* 2, *p.* 212, 215; *Miquel, Fl. Ind. Bat.* 2, *p.* 234, 260.

TIMONIUS FORSTERI, *DC. l. c.* Erithalis polygama, *Forst.* E. uniflora, *Banks; Gærtn. f.* Burneya Forsteri, *Cham. & Schlecht. l. c.* Polyphragmon minus, *A. Rich. l. c.; DC. l. c.* Bobea Forsteri & B. Gærtneri, *Korthals, l. c.* — South Sea Islands.

TIMONIUS SAPOTÆFOLIUS (*Gray, in Bot. Pacif. Expl. Exped. ined.*): foliis etiam nascentibus cum stipulis majusculis ramulisque glaberrimis elliptico-oblongis utrinque acuminatis venulis creberrimis

lineato reticulatis quasi tenuiter nervoso-striatis, areolis lineari-elongatis parallelis, venis primariis obsoletis; pedunculis fructiferis petiolum æquantibus; pyrenis linearibus, putamine tenui. — Feejee Islands.

TIMONIUS AFFINIS (*Gray, l. c. ined.*): foliis ovalibus obscure penniveniis, venis subreticulatis, retibus venularum varie versis hinc inde contrariis; — cæterum præcedentis. — Feejee Islands.

BOBEA, *Gaudichaud.*

Flores hermaphroditi (an semper?). Calycis limbus cupuliformis persistens. Corolla hypocraterimorpha, glabra, intus nuda, lobis 4 ovalibus obtusissimis æstivatione valde imbricatis. Stamina tubo inserta; filamentis brevibus. Stylus superne inæqualiter 3-10-fidus, lobis filiformibus apice introrsum stigmatosis. Ovarium 3-10-loculare. Ovula in loculis solitaria, funiculo brevissimo strophiolæformi suspensa. Drupa 3-10-pyrena; pyrenis parallelis osseis crassis, sarcocarpio tenui. Semen cylindricum, cum funiculo strophiolato crassissimo duro (instar obturamenti) eodem latius loculum angustum implens: albumen vix ullum. Embryo semini conformis; radicula oblonga cylindrica; cotyledonibus brevibus subcomplanatis. — Arbores Sandwicenses; stipulis squamaceis interpetiolaribus discretis caducis; venulis foliorum creberrime ac tenuissime reticulatis; pedunculis uni-paucifloris.

Bobea, *Gaudich. in Bot. Voy. Freyc, p.* 473, *t.* 93, non *Korthals.*
Bobæa, *A. Rich. Mem. Rubiac. p.* 135.
Burneyæ sp. No. 2, *Cham. & Schlecht. in Linnæa, l. c.*
Timonius, *DC. Prodr.* 4, *p.* 461 ex char., non *Rumph.*

1. BOBEA ELATIOR (*Gaudich. l. c.*): glaberrima; foliis obovatis oblongisve basi in petiolum sat longum attenuatis; pedunculis gracilibus 3-7-floris, flore intermedio sessili, omnibus basi subcupulatis. — Oahu, Sandwich Islands.

2. BOBEA BREVIPES (*Gray in Bot. Expl. Exped. ined.*): foliis oblongis vel subovatis breviter petiolatis, junioribus præsertim ramisque hirto-pubescentibus, pedunculis brevibus unifloris? — Oahu, Sandwich Islands.

The name of *Bobea* is to be preferred to *Burneya*, not only because Gaudichaud's plate was earliest published, but because Chamisso's genus was founded primarily upon Forster's *Erithalis*, which is a genuine *Timonius*.

The æstivation of the corolla (now first made out), the completely hermaphrodite blossoms, as far as is known, and the uniseriate, com-

paratively few, and very thick-walled pyrenæ, amply distinguish *Bobea* from *Timonius*. From the æstivation, the two genera would fall into different subtribes, if we implicitly follow the distribution of the *Coffeeæ* suggested by Mr. Bentham, who, in the Niger Flora, and in the Kew Journal of Botany, has brought out, with his usual sagacity, the best characters for a natural arrangement of the *Rubiaceæ*. *Timonius*, with valvate æstivation, would fall into his *Vanguerieæ*, and *Bobea* into his *Guettardeæ*. But characters from the æstivation of the corolla, convenient and generally reliable as they are, must in this, as in many other cases, give way to other considerations. And the close similarity of these two genera in most other respects, especially in their nearly exalbuminous embryo, the plug-shaped funiculus filling the upper part of the cell, as also the delicate venular meshes of the leaves (of which traces occur in most *Chomeliæ* and *Guettardæ*), plainly requires us to refer *Timonius* also to the *Guettardeæ*. This is well confirmed by Wight and Arnott's genus *Eupyrena*, which is exactly intermediate between *Timonius* and *Bobea*, having the corolla, &c. of the former, and the ovary and fruit of the latter.* A leading character of the *Guettardeæ*, as I should define the group, has escaped general notice, namely, the wholly or nearly exalbuminous embryo, the embryo being a macropodous radicle with small and obscurely-marked cotyledons occupying merely the lower extremity. This, as well as the true pericarpic direction of the embryo, however, was rightly understood by Gærtner, in *Guettarda speciosa*. What A. Richard calls a thin fleshy albumen in this plant, is apparently the tegmen of the seed; and what he took for the radicular extremity of the embryo ("cet embryon est dressé") is the cotyledonar end. The mistake is the more remarkable on Richard's part, since he had recognized the crustaceous plug at the summit of the cell as the funiculus. Otherwise, the tapering of the ovule and young seed to an acute apex at the base of the cell might readily lead one to regard them as attached there, and may have given origin to the character "semina erecta," assigned by De Candolle and others, and which even Miquel leaves in the generic character (with a mark of doubt), although, following Bentham, he rightly defines the

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* The fruits of *Eupyrena*, with which I have been supplied by Dr. Hooker and Dr. Harvey, do not furnish sound seeds; but I have no doubt that these are exalbuminous or nearly so. The ovary is sometimes only quinquelocular; and the ovules are suspended. "Semina erecta" is a phrase wrongly introduced into the generic character by Endlicher.

Guettardeæ as having pendulous (more correctly, suspended) ovules. In *G. elliptica*, the only other species of the genus which I have with mature fruit, the embryo is similar to that of *G. speciosa*. The cotyledons, although difficult to separate in the mature seed, are plainly discernible in rather unripe ones; they are very short, oval, thin, and of no greater diameter than the radicle at that end.

That the seed of *Timonius* is exalbuminous had been long ago ascertained by Mr. Brown, who directed my attention to the fact.

The occasional absence of albumen in this family is not very surprising. Those systematists who regard the difference between a deposit of nourishing matter *around the embryo* and *in the embryo* as one of very high taxonomic importance, should consider how large is the number of natural orders in which the two modes are now known to coexist.

From the indications now given, the true *Guettardeæ* may be characterized as follows: —

Subtr. GUETTARDEÆ. Corollæ lobi æstivatione imbricati, raro valvati. Ovarium bi-multiloculare: ovula in loculis solitaria suspensa. Drupa bi-plurilocularis vel di-pleiopyrena. Semina e funiculo crasso obturamentiformi appensa: albumen nullum vel parcum. Radicula longa: cotyledones parvi.

We have a new Guettardæous plant, possibly a *Guettarda*, from the Feejee Islands, of which blossoms are wanting for the determination of the genus. Of the following, we possess rather better materials, but still the genus is uncertain.

CHOMELIA? SANDWICENSIS (*Gray, in Expl. Exped. ined.*): ramis junioribus pubescentibus; foliis glaberrimis oblongo-ovatis acuminatis basi rotundatis; fructu dipyreno globoso calycis lobis majusculis ovalibus obtusissimis recurvis coronato. — Oahu, Sandwich Islands.

When better known, this may prove to be a new generic type. But it is more likely to fall into *Chomelia*, or else into *Guettardella* of Bentham, which is hardly sufficiently distinguished by the more numerous ovarian cells. *Chomelia ribesioides*, Benth., occasionally exhibits a 4-celled putamen, and the pyrenæ of *Guettardella Chinensis* are frequently consolidated in the same manner; —just as in *Arctostaphylos*, in which the pyrenæ are either discrete or variously concrete in the same species. The veinlets of the leaves, especially of the upper surface, form minute and elegant transverse reticulations. The fruit is that of a *Bobea* reduced to two pyrenæ; the seed has a similar plug-like funiculus; the embryo is invested by a very thin layer of albumen; its lower extremity bears a pair of very minute and thin cotyledons.

2. *Canthium and the Vanguerieæ.*

CANTHIUM, § TAROTEA. Corolla hypocraterimorpha, tubo lobis duplo longiore: antheræ subsessiles, mucronatæ.

To this section, designated by one of the aboriginal names of the Tahitian species, as recorded by Forster, belongs *Chiococca barbata* of Forster, which Mr. Bentham (in the Niger Flora) has already referred to *Canthium*, and the following closely related species: —

CANTHIUM SESSILIFOLIUM (*Gray in Expl. Exped. ined.*): inerme, glabrum; foliis oblongo-ovatis seu ovato-lanceolatis basi rotundata fere sessilibus chartaceis supra lucidis; pedicellis solitariis binis ternisve in axillis flore gracili (semipollicari) dimidio brevioribus; pedunculo communi vix ullo; limbo calycis 5-dentato; pyrenis seminibusque fere rectis angustis. — Vanua-levu, Feejee Islands.

To the character of Bentham's subtribe *Vanguerieæ*, it will be necessary to add, that the seeds have a copious albumen and well-developed cotyledons. In *Canthium*, the ovules are only *pendulous*, and sometimes semi-anatropous, or nearly so. *Morinda* was referred to this group by Mr. Bentham, through some oversight.

3. *Ixoreæ.*

These are well characterized by the *convolute* æstivation of the corolla and the peltate or centrally affixed ovules. Miquel incorrectly characterizes the group (his tribe *Pavetteæ*) as having the lobes of the corolla *imbricated* in æstivation, whereas they are most obviously convolute, as Mr. Bentham distinctly stated in his note, explaining that he used the word *imbricated* in a general sense for all overlapping forms. The more definite term (convolute) would have obviated misapprehension, and would be strictly correct, so far as is known.

To unite *Ixora* and *Pavetta*, as Richard, Blume, and Miquel have done, seems not unnatural. But the former name ought in that case to be retained, not only because it had been preferred by Lamarck, but because, as a Linnæan genus, it is ten years older than *Pavetta*, appearing as it does in the first edition of the Genera Plantarum.

The collection which forms the basis of these remarks comprises one genuine South American *Ixora*, and three undescribed Oceanic species, which, along with *I. fragrans* (*Cephaelis fragrans*, Hook. & Arn. Bot.

Beech., p. 64, t. 13), constitute a marked section of the genus (*Phylleilema*), on account of a pair of bracteant leaves forming a diphyllous involucre to a cluster of three or more sessile flowers.

IXORA ERIANTHA (*Gray, in Expl. Exped. ined.*): stipulis aristato-subulatis; foliis ovalibus ovatisque obtuse subacuminatis subsessilibus basi rotundatis vel subcordatis ramisque glabris; cyma parva terminali floribusque subsessilibus; corolla extus cum calyce pubescente, lobis ovato-lanceolatis acutis tubo suo gracillimo triplo brevioribus. — Brazil, near Rio Janeiro. — Aff. *I. Bahiensi* et *I. Schomburgkianæ*, Benth.

IXORA (PHYLLEILEMA) SAMOENSIS (*Gray, l. c.*): glaberrima; foliis ovalibus utrinque obtusis vel obtusiusculis, floralibus etiam petiolatis ovatis capitulum triflorum fulcrantibus; dentibus calycis subulatis; corolla glabra; stipulis longissime aristato-subulatis. — Upolu, Samoan Islands.

IXORA (PHYLLEILEMA) VITIENSIS (*Gray, l. c.*): glaberrima; foliis ovato-oblongis acuminatis basi rotundatis, floralibus seu bracteis late cordatis arcte sessilibus capitulum triflorum fulcrantibus; dentibus calycis brevissimis; corolla glabra; stipulis longissime aristatis. — Ovolau, Feejee Islands.

IXORA (PHYLLEILEMA) AMPLIFOLIA (*Gray, l. c.*): foliis elongato-oblongis subacuminatis basi obtusissimis subcordatisve glabris, floralibus bracteisve ovalibus arcte sessilibus capitulum pluriflorum fulcrantibus; dentibus calycis brevissimis; corolla cum ovario extus pubera; stipulis breviter subulato-aristatis. — Samoan Islands.

4. *Morindeæ.*

Through some oversight, Bentham, in the Niger Flora, mentions the *Morindeæ* as belonging to his subtribe *Vanguerieæ*. Miquel, in his recent Flora of the Dutch East Indies, adopting this view without examination, introduces the phrase "ovulis pendulis" into the characters of his tribe *Morindeæ* and of the genus *Morinda*, and alters that of *Tribrachya*, Korthals, in conformity with that view. Yet he (rightly enough) reduces *Sphærophora* of Blume to *Morinda*, although Blume's analyses represent anatropous erect ovules. An examination of the flowers of some *Morinda*, so obviously demanded by this patent discrepancy, would have shown the micropyle of the ovule, and in fruit the radicle, to be inferior. In some species, as in *M. citrifolia*, the ovule is fixed by near its middle; in others, nearer the micropyle, — in some so close to it that the ovule is truly anatropous and ascending or nearly erect, thus invalidating Korthals' *Rennellia* as well as his *Tribrachya.* In the arrangement of the *Coffeæ*, therefore, it would seem best to take the concretion of the flowers into account, and to regard *Morinda* as the type of a distinct subtribe, in other respects intermediate between the *Ixoreæ* and the *Psychotrieæ.*

Besides a rather doubtful variety of *Morinda umbellata* (which includes *M. tetrandra* of Jack) from Tahiti, we have the following new Oceanic species: —

MORINDA MYRTIFOLIA (*Gray, l. c.*): glaberrima; ramis gracilibus scandentibus; stipulis in vaginam truncatam brevem connatis, foliis sublonge petiolatis subcoriaceis nitidulis lanceolato- seu elliptico-oblongis obtusis nunc obtuse acuminatis, venis primariis haud conspicuis axillis nudis; pedunculis terminalibus brevibus solitariis 2 – 4-nisve; capitulis plurifloris globosis; tubo corollæ 4-fidæ intus villoso-barbato. — Feejee Islands. — The ovule or seed in this and in *M. mollis* is semi-anatropal; in the two others, anatropal, and from near the base of the cell: radicle inferior.

MORINDA LUCIDA (*Gray, l. c.*): glabra, scandens; stipulis in vaginam brevem connatis, summis utrinque 1 – 2-cuspidatis; foliis ovatis et oblongo-lanceolatis acuminatis chartaceis supra lucidis venulis reticulatis, subtus opacis, venis primariis tantum perspicuis in axillis sæpius barbellatis; pedunculis (fructiferis) solitariis ternisve terminalibus petiolos adæquantibus; capitulis plurifloris; syncarpio globoso pollicari. — Feejee Islands.

MORINDA MOLLIS (*Gray, l. c.*): scandens, undique velutino-pubescens; foliis membranaceis ovato- seu obovato-oblongis caudato-acuminatis basi sinu parvo subcordatis perspicue penniveniis; pedunculis plurimis in umbella terminali; capitulis plurifloris; syncarpio globoso pubescente. — Feejee Islands.

MORINDA BUCIDÆFOLIA (*Gray, l. c.*): glabra, scandens; stipulis subdistinctis; foliis obovato-cuneatis obtusis vel retusis coriaceis supra nitidulis subtus venulis inter costas rectas prominulas crebre reticulatis; pedunculis plurimis terminalibus; capitulo globoso 7 – 10-floro. — Feejee Islands.

5. *Psychotrieæ.*

The novelties of the collection belong to *Myrmecodia*, *Hydnophytum*, *Straussia* (*Coffea*, § *Straussia*, DC.), to the large genus *Psychotria*, to *Chasalia*, and to a new genus of *Psychotrieæ* (including *Cephaelideæ*), remarkable for the greatly-developed and corolliform limb of the calyx.

MYRMECODIA IMBERBIS (*Gray in Expl. Exped. ined.*): inermis; foliis lanceolato- seu spathulato-oblongis; corolla tubulosa intus nuda glaberrima calyce cum ovario quadruplo longiore; stylo simplicissimo; stigmate quadri-apiculato indusio lanato-ciliato cincto; fructu (in sicco) obpyramidato quadrilobo, pyrenis 4 corneis. — Feejee Islands. — Parasitic, or pseudo-parasitic, on trees, in the manner of its allies, by a dilated tuberous base, cavernous within. Corolla thickish, half an inch in length, tubular, 4-cleft, perfectly glabrous and naked within and without, and destitute of scales, beard, or other appendages in the throat.

There is no small obscurity about the one or two old species of this genus, and respecting the distinction between it and *Hydnophytum*, which the Dutch botanists ought to clear up. But the present species — notwithstanding that the corolla wants the beard described by Jack, and the fornicate scales mentioned by Blume — is undoubtedly a genuine member of Jack's genus *Myrmecodia;* and its stigma is probably similar to the "*stigma simplex tomentosum*" of *M. tuberosa.* But this stigma in our plant consists of four minute apiculate lobes, terminating a filiform entire style, and surrounded by a kind of indusiate margin which is fringed by a circle of delicate arachnoid hairs. — From the analyses I should refer Gaudichaud's *M. inermis* and *M. echinata* to *Hydnophytum.*

HYDNOPHYTUM LONGIFLORUM (*Gray, l. c.*): foliis elongato-oblongis; corolla gracillima (semipollicari) intus glabra, tubo lobis oblongis pluries longiore; stigmatibus 2 petaloideis reniformibus; drupa dipyrena. — Feejee Islands.

The one or two dubious Coffeas of Chamisso, from the Sandwich Islands, are not particularly related to *Coffea* (which, although strangely left in the *Psychotrieæ* by Miquel, contrary to the assigned characters, had already been well defined by Bentham as having "the æstivation and placentation of *Ixora* and *Pavetta*, with an axillary inflorescence and a peculiar seed"), but are near to *Chasalia*, from which they are distinguished by the short corolla and the scarcely meniscoidal seed. Nuttall has indicated these plants, in the Hookerian herbarium, as a new genus, *Apionema;* but his name must give place to De Candolle's long-published sectional name of

STRAUSSIA.

Calyx tubo turbinato; limbo cupuliformi truncato vel repando brevi. Corolla brevis, 4 – 5-fidi; lobis tubo æquilongis seu longioribus æstiva-

tione valvatis. Stamina 4-5, fauci inserta: filamenta brevia: antheræ oblongæ, basifixæ. Stylus filiformis: stigmata 2 subdilatata. Ovarium biloculare. Ovula in loculis solitaria, e basi erecta, anatropa. Drupa sæpius pyriformis, dipyrena; pyrenis chartaceis vel tenuiter cartilagineis plano-convexis lævibus. Semen plano-convexum seu leviter meniscoideum, testa tenui adhærente: albumen corneum, ventre sulco profundo clauso exaratum, interne fissuratum. Embryo parvus *Coffeæ* vel *Psychotrieæ.* — Arbores aut frutices Sandwicenses; stipulis interpetiolaribus subconnatis obtusis mox deciduis; cyma terminali multiflora longe pedunculata; floribus parvis.

STRAUSSIA KADUANA: foliis subsessilibus cuneato-obovatis, junioribus subtus ad costas cum pedicellis calycibusque sæpissime ferrugineo-pilosulis; corollæ fauce imberbi; drupa pyriformi subquadrangulata. Coffea Kaduana, *Cham. & Schlect. in Linnæa,* 4, *p.* 33; *DC. Prodr.* 4, *p.* 502; *Hook. & Arn. Bot. Beech. p.* 86; *Walp. in Rel. Meyen. p.* 352. Apionema obovata & A. penduliflora, *Nutt. in Herb. Hook.* — Oahu, Sandwich Islands. — The thin fissure in the axis of the albumen is symmetrical, not lined with a membrane, and not owing to an infolding, like that of a coffee-grain. — It is questionable whether the throat of the corolla is always naked, and whether the second species is distinct from the present. The five bearded spots certainly exist in the *Coffea Chamissonis* of Hooker and Arnott, although they were overlooked (they are never so conspicuous as would be inferred from Chamisso's description); hence that is to be referred to

STRAUSSIA MARINIANA: tota vel fere glabra; foliis breviter seu brevissime petiolatis obovato-oblongis ellipticisve; corollæ fauce inter stamina breviter barbata; drupa obovato-pyriformi. Coffea Mariniana, *Cham. & Schlect. l. c.; DC. l. c.* C. Chamissonis, *Hook. & Arn.* Apionema sulcata, *Nutt. in Herb. Hook.* — Oahu, Sandwich Islands.

STRAUSSIA HAWAIENSIS (sp. nov.): foliis longius petiolatis obovatis calycibusque glaberrimis; corollæ fauce inter stamina barbata; drupa parva ovoidea vel obovata. — Hawaii, Sandwich Islands. — The conspicuously petioled and usually large leaves, and the small fruit (only three, instead of six or seven, lines in length), distinguish this species from the preceding.

The following species of *Chasalia* approach *Psychotria.*

CHASALIA AMICORUM (*Gray, l. c.*): glaberrima; stipulis vaginantibus; foliis oblongis ovalibusque basi acutis, venis primariis 6-8; cyma laxiflora breviter pedunculata; calycis tubo ultra ovarium obovatum producto et in limbum crateriformem subquadridentatum abrupte expanso; fructu obovato; pyrenis 2 apice subtridentatis dorso leviter carinatis ventre concaviusculis haud sulcatis; semine scutelliformi incurvo. — Tongatabu, Friendly Islands.

CHASALIA PYRIFORMIS (*Gray, l. c.*); glaberrima; stipulis vaginantibus brevibus; foliis oblongis basi acutis, venis primariis utrinque 7 – 9; cyma pauciflora sessili; fructu oblongo-pyriformi calycis limbo cupulato vix 4-dentato coronato; pyrenis 2 ventre planis dorso leviter tuberculatis haud carinatis; semine scutelliformi planiusculo. — Samoan or Navigators' Islands.

The following new species of *Psychotria* are all Polynesian, except the last.

PSYCHOTRIA BRACKENRIDGII (*Gray, l. c.*): stipulis caducis; foliis oblongo-lanceolatis utrinque acutis vel acuminatis basi in petiolum longiusculum angustatis fere glabris chartaceis; pedunculis 1 – 5 terminalibus elongatis cymam trichotomam multifloram gerentibus cum radiis pedicellisque ferrugineo-puberis; fructibus ovalibus 8-costatis truncatis calycis limbo parvo cupuliformi coronatis puberulis; pyrenis tenuiter cartilagineis intus planis dorso convexo carinato-tricostatis. — Feejee Islands. (In fruit.)

PSYCHOTRIA CLOSTEROCARPA (*Gray, l. c.*): glabra; foliis oblongo-lanceolatis magnis basi in petiolum longum angustatis, venis primariis conspicuis utrinque 15 – 19; cymis terminalibus pedunculatis; fructibus pedicellatis fusiformibus limbo calycis cupulato truncato collo sublatiore coronatis; pyrenis lineari-oblongis apice bidentatis intus planis dorso obtuse tricostatis suberoso-crustaceis. — Samoan or Navigators' Islands. — Fruits about 7 lines long: pyrenæ 2 lines wide.

PSYCHOTRIA FORSTERIANA (*Gray, l. c.*): glabra; stipulis tenuiter scariosis caducis; foliis membranaceis oblongo-lanceolatis nunc obovato-oblongis utrinque acuminatis modice petiolatis, venis primariis 9 – 11-jugis; cyma multiflora terminati composita tripartita vel tripla, pedunculis radiisve petiolum æquantibus; floribus confertis pedicellatis parvis; calycis limbo expanso integerrimo ovario æquilongo; corolla brevi usque ad medium 5-fida fauce villosissima; fructibus obovatis retusis, junioribus fere obcordatis; pyrenis dorso obtuse costatis subrugosis intus concaviusculis. P. Asiatica, *Forst. Prodr. p.* 16? — Var. VITIENSIS: foliis longius petiolatis nunc undulatis; fructu vix retuso. — Tahiti; Samoan or Navigators' Islands: and the variety from the Feejee Islands.

PSYCHOTRIA TURBINATA (*Gray, l. c.*): fere glabra; stipulis caducis; foliis obovato-oblongis nunc oblongo-lanceolatis basi in petiolum longiusculum attenuatis submembranaceis, venis primariis 9 – 10-jugis; cyma terminali multiflora petiolos vix superante; fructibus turbinatis vertice planis; pyrenis 2 vel 3 ventre inferne planis superne profunde exsculptis dorsoque tuberculato-incrassatis.—Feejee Islands. (In fruit: flowers not seen.)

PSYCHOTRIA INSULARUM (*Gray, l. c.*): glabra; stipulis caducis; foliis oblongis utrinque acutis vel acuminatis longiuscule petiolatis chartaceo-membranaceis, venis primariis 7 – 10-jugis; cyma terminali sessili composita, radiis 3 – 5 trichotomis divisionibusque divaricatis gracilibus apice 3 – 5-floris; floribus graciliter pedicellatis; calycis limbo crateriformi ovario æquilongo, dentibus denticulisve 5 acutissimis; corolla fauce villosissima; fructibus ovoideis breviter coronatis, pyrenis intus planis dorso tricostatis et molliter rugoso-muriculatis. — Samoan and Friendly Islands.

PSYCHOTRIA TEPHROSANTHA (*Gray, l. c.*): stipulis caducis; foliis ovalibus utrinque abrupte acutis vel acuminatis petiolatis ramisque glabris; cyma terminali pedunculata effusa decomposita, pedicellis gracilibus flore brevioribus; calycis limbo subintegerrimo cupulato ovario turbinato breviore; corolla infundibuliformi extus pruinoso-canescente. — Feejee Islands.

PSYCHOTRIA PARVULA (*Gray, l. c.*) : facie *P. serpentis*, glaberrima; ramis gracilibus foliosis; stipulis caducis; foliis obovatis obtusis in petiolum angustatis (pollicaribus) chartaceis, venis utrinque 5 – 6 inconspicuis; cymis terminalibus laxifloris; calycis limbo parvo acutiuscule 5-dentato; fructibus globosis; pyrenis hemisphæricis dorso 3 – 2-costatis, costis obtusissimis. — Feejee Islands. (Corolla, &c. not seen.)

PSYCHOTRIA GRACILIS (*Gray, l. c.*) glaberrima; ramis gracillimis; stipulis quadri-subulatis deciduis; foliis lanceolatis membranaceis attenuato-acuminatis basi in petiolum angustatis; cyma parva terminali pluriflora breviter pedunculata; calycis limbo expanso crateriformi ovario subæquilongo 5-dentato; corolla brevi 5-fida intus glabra; filamentis gracilibus antheris longioribus. — Feejee Islands.

PSYCHOTRIA CALYCOSA (*Gray, l. c.*): glabra; stipulis caducis; foliis anguste oblongis seu oblongo-lanceolatis subacuminatis basi in petiolum brevem attenuatis; cyma terminali foliis breviore pedunculata confertiflora; floribus pedicellatis; calycis limbo amplissimo foliaceo e basi infundibuliformi expanso 5-lobo; corolla tubuloso-infundibuliformi breviter 5-fido, lobis apice saccatis extus hirtellis intus barbatis. — Feejee Islands. (Fruit unknown.)

Psychotria macrocalyx (*Gray, l. c.*): glabra; ramis gracilibus foliosissimis; stipulis ovatis mucronatis caducis; foliis lanceolatis seu oblongo-lanceolatis longe acuminatis chartaceis basi in petiolum attenuatis; pedunculis 1 – 3 terminalibus 1 – 5-floris pedicellisque filiformibus; calycis limbo tubuloso angusto breviter 5-dentato persistente drupa ovoidea subæquilongo; pyrenis compressis intus planis dorso 1 – 3-carinatis. — Feejee Islands and Tongatabu.

Psychotria filipes (*Gray, l. c.*): glabra; stipulis caducis; foliis lanceolato- seu obovato-oblongis acuminatis basi paullo angustata sæpius subcordatis longe petiolatis; pedunculis terminalibus 2 – 5 filiformibus folia subæquantibus cymam effusam plurifloram gerentibus, radiis 3 – 4 pedicellisque gracilibus; calycis limbo crateriformi 4-dentato ovario breviore; corolla brevi 4-fida fauce fere nuda, fructu immaturo ovato. — Feejee Islands.

Psychotria apodantha (*Gray, l. c.*): stipulis longe setaceo-acuminatis caducis; foliis lanceolatis sensim acuminatis basi acutis obtusisve membranaceis glabris; petiolo primum ferrugineo-puberulo; fructibus paucis terminalibus subsessilibus ovali-oblongis calycis limbo cupuliformi leviter 5-dentato coronato; pyrenis seminibusque intus planis dorso 1 – 3-costatis. — Samoan or Navigators' Islands.

Psychotria hypargyræa (*Gray, l. c.*): glabra; stipulis bifidis caducis; foliis obovato-oblongis seu oblongo-lanceolatis acuminatis basi in petiolum brevem attenuatis chartaceis supra viridibus subtus argento-pallidis; pedunculis 1 – 3 terminalibus apice 3 – 5-floris; floribus brevissime pedicellatis; calycis limbo parvo 5-dentato; corolla infundibuliformi breviter 5-fida intus glabra; filamentis brevissimis; fructibus globosis (in siccis acute costatis) calvis; pyrenis cartilagineis tenuibus ventre planis leviter obcordatis margine acutissimis dorso medio 1 – 3-cristato-alatis; semine triptero. — Feejee Islands.

Psychotria (Piptilema*) cordata (*Gray, l. c.*): glabra; stipulis ovatis? caducis; foliis oblongo- seu lanceolato-ovatis promisse acuminatis basi cordatis longe petiolatis; capitulo arcte sessili plurifloro bracteis squamaceis obovato-rotundis circiter 6 caducis involucrato; calycis limbo brevi truncato; corolla tubulosa 5 – 7-mera; fructibus elongato-pyramidatis, pyrenis dorso alato-cristatis marginibus infra medium angulato-productis. — Feejee Islands.

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* PIPTILEMA, sub-gen. *Psychotriæ, Cephaelidi* proxima. Stipulæ squamaceæ, caducissimæ. Flores sessiles, capitellati, ebracteolati; capitulo terminali primum bracteis squamaceis caducis involucrato. Pyrenæ compresso-planæ, costa dorso in cristam seu alam producta, marginibus inferne subalato-dilatatis. Semen quasi tripterum.

Psychotria (Piptilema) Pickeringii (*Gray, l. c.*): glabra; stipulis caducis; folliis oblongo-lanceolatis seu obovato-oblongis promisse acuminatis basi angustata subacutis obtusisve; capitulo arcte sessili plurifloro bracteis squamaceis caducis involucrato; calycis limbo brevissimo truncato; corolla tubulosa 4 – 6-mera; fructibus obovatis obtusis basi quadrangulatis, pyrenis dorso et inferne marginibus cristatis. — Feejee Islands.

Psychotria (Piptilema) platycocca (*Gray, l. c.*): glaberrima; stipulis caducis; foliis oblongis utrinque acutis; pedunculis terminalibus demum lateralibus petiolum adæquantibus glomerulos 1 – 3 paucifloros bracteis caducis primum involucratos gerentibus; fructibus ovato-tetraquetris, pyrenis dorso et marginibus præsertim inferne acute cristatis. — Feejee Islands.

Psychotria apocynifolia (*Gray, l. c.*): glaberrima; foliis oblongis seu lanceolato-oblongis utrinque acutis vel acuminatis breviter petiolatis membranaceis concoloribus, venis primariis tenuibus angulo recto patentibus prominulis; stipulis brevissimis triangulatis, summis integris, cæteris bipartitis; cyma terminali pedunculata laxiflora foliis breviore; bracteis minimis subulatis; calyce obtuse 5-dentato; corolla infundibuliformi extus scabriuscula intus fauce tantum pilosa; stylo hirtello. — Brazil, near Rio Janeiro.

CALYCOSIA, Nov. Gen.

Calyx tubo angusto; limbo valde ampliato infundibuliformi membranaceo 5-fido, lobis sæpe inæqualibus ciliato-barbatis. Corolla calycem modice superans, tubulosa, fauce infundibuliformi; lobis 5 patentibus apice corniculato-cucullatis æstivatione valvatis. Stamina 5, fauci corollæ inserta, subinclusa: filamenta brevissima: antheræ oblongo-lineares basi bilobæ. Stylus filiformis, basi disco epigyno elevato arcte cinctus: stigmata 2 vel 3, linearia seu filiformia. Ovarium 2 – 3-loculare. Ovula in loculis solitaria, e basi erecta, anatropa. Drupa apice nuda, dipyrena, raro tripyrena; pyrenis cartilagineis facie planis. Semen cavitati conforme. Embryo in basi albuminis æquabilis cornei parvus; cotyledonibus late ovalibus planis radicula conica brevioribus et latioribus. — Frutices crassiramei, macrophylli; stipulis intrafoliaceis subvaginatis; floribus capitato-congestis, capitulis bracteis latissimis membranaceis inciso-lobatis involucratis ad apicem caulis cymoso-glomeratis.

CALYCOSIA PETIOLATA (*Gray, l. c.*): foliis obovatis seu obovato-lanceolatis in petiolum attenuatis; calyce breviter 5-lobo, lobis oblongis; pyrenis dorso haud costatis. — Feejee Islands.

CALYCOSIA SESSILIS (*Gray, l. c.*): foliis spathulato-lanceolatis basi sensim angustatis sessilibus; floribus arcte capitato-congestis; calyce ultra medium 5-fido, lobis linearibus; pyrenis dorso tricarinatis. — Savai, one of the Samoan Islands.

The genus is well distinguished from *Psychotria* or *Cephaelis* by the remarkably large, funnel-form, and deciduous limb of the calyx.

6. *Coprosma.*

Of this peculiarly South Sea genus we have six new species from the Northern hemisphere, — namely, from the Sandwich Islands. All but one of them, however, have lain long in herbaria. The two most remarkable species, *C. rhynchocarpa* and *C. ernodeoides*, were gathered, one of them by Nelson, in Cook's last voyage, the other, as well as *C. Menziesii*, by Menzies, in Vancouver's voyage. We have also a species from Tahiti, and another from the Feejee Islands.

COPROSMA RHYNCHOCARPA (*Gray in Expl. Exped. ined.*): fruticosa, fere glabra; stipulis triangulari-acuminatis basi connatis; foliis chartaceis oblongis seu lanceolato-oblongis acutis basi in petiolum gracilem attenuatis; pedunculis paucifloris pedicellisve brevissimis; fl. masc. calyce subintegro tubo corollæ 6 – 7-fidæ breviore, fl. fœm. 5 – 6-mero, calycis tubo ultra ovarium globosum longissime producto (limbo cupulari breviter 5 – 6-dentato) super drupam rostri instar persistente. — Hawaii, Sandwich Islands: gathered also by Nelson, Macrae, and Gaudichaud. — Most remarkable for the beak of the fruit, from 1½ to 3 lines long, and forming as it were a stipe to the small, abruptly dilated limb of the calyx persistent on its summit.

COPROSMA LONGIFOLIA (*Gray, l. c.*): glaberrima, fruticosa; stipulis in vaginam oblongam coalitis e basi circumscissa caducis; foliis subcoriaceis nitidulis lanceolatis utrinque acutis sublonge petiolatis; pedunculis fructiferis petiolo brevioribus capitato-plurifloris; drupa ovoidea calycis limbo brevi 5 – 7-dentato apiculato. — Oahu, Sandwich Islands: also gathered by Gaudichaud.

COPROSMA FOLIOSA (*Gray, l. c.*): fruticosa, glabra; stipulis triangulari-acuminatis basi subconnatis; foliis chartaceis lanceolatis seu oblongo-lanceolatis utrinque acutis vel acuminatis; pedunculis petiolo gracili brevioribus paucifloris; floribus 6–7-meris; drupa obovato-globosa apice nuda. Euarthronia foliosa, *Nutt. in Herb. Hook.* — Oahu, Sandwich Islands: where it was also gathered by Gaudichaud, Nuttall, and Seemann.

COPROSMA PUBENS (*Gray, l. c.*): fruticosa; stipulis late deltoideis connatis strigoso-sericeis; foliis chartaceis obovato-oblongis oblongisve basi in petiolum attenuatis supra glabratis subtus reticulato-venosis ramulisque pubescentibus; pedunculis petiolo brevioribus vel subnullis; floribus confertis, masculis 6–7-meris, calyce irregulari, corolla breviter infundibuliformi. — Var. *α.* drupis secus ramos subsessilibus basi bibracteolatis ovoideis rostello brevi apiculatis. Var. *β.* KAUENSIS: drupis obovatis obtusissimis plurimis sessilibus in pedunculo communi. — Sandwich Islands.

COPROSMA MENZIESII (*Gray, l. c.*): fruticosa; ramis pubentibus; stipulis brevibus connatis sericeo- vel strigoso-pubescentibus; foliis obovatis seu ovalibus raro oblongis reticulatis glabris; pedunculis paucifloris brevibus sæpe aggregatis vel compositis; floribus 5–11-meris; calyce cupulato breviter dentato; drupa subglobosa calycis limbo brevi coronata. — Var. *α.* foliis chartaceis demum coriaceis ovalibus seu ellipticis acutis vel obtusis basi in petiolum longiusculum vel brevem contractis. Var. *β.* foliis chartaceis longiuscule petiolatis; pedunculis fœmineis geminis ternisve 1–3-floris gracilibus. Var. *γ.* foliis minoribus spathulatis obovatisve crassis in ramulos confertissimis breviter petiolatis; drupis fere sessilibus. — Hawaii, Sandwich Islands. Collected by Menzies, Macrae, Gaudichaud, and Douglas.

COPROSMA ERNODEOIDES (*Gray, l. c.*): fruticosa, procumbens, glabra (nisi ramis junioribus); stipulis brevissimis connatis; foliis confertissimis parvis sublinearibus crassis aveniis nitidis sempervirentibus margine parce hispidulis; floribus fœmineis sessilibus ramulos terminantibus 4-meris; corolla tubulosa; drupa globosa. — Hawaii, Sandwich Islands. Collected by Menzies, &c.

COPROSMA TAITENSIS (*Gray, l. c.*): *C. robustæ* affinis, glaberrima; stipulis triangulatis acutis subconnatis persistentibus; foliis subcoriaceis oblongis obtusis basi in petiolum angustatis; pedunculis brevissimis vel breviusculis 2–5-floris; drupa obovato-globosa apice nuda. — Tahiti, Society Islands. (In fruit only.)

Coprosma persicæfolia (*Gray, l. c.*): fruticosa, glabra; stipulis connatis late triangulatis cuspidatis; foliis membranaceis lanceolatis sensim acuminatis, petioli brevi; pedunculis brevissimis paucifloris; calycis limbo vix dentato; corolla profunde quadrifida; drupa oblonga. — Feejee Islands.

The Corresponding Secretary, in behalf of the author, presented the following paper: —

Salices Boreali-Americanæ: a Synopsis of North American Willows. By N. J. Andersson, Professor of Botany in the University of Stockholm, Sweden.

In attempting an enumeration of the Willows of North America, every author must feel himself rather at a loss. Any acquaintance, even the most superficial, with the different species of that genus, is sufficient to show that a proper treatment of the subject requires, not only access to the richest collections, but also an opportunity of seeing almost every shrub for many years. Distributed over a great part of the surface of the globe, inhabiting a great variety of localities, the species of this genus are exposed to the most heterogeneous influences from all kinds of soil and all variations of climate, — thus presenting a greater multiplicity of forms than most plants now known. The literature of the subject also proves how very difficult it has been, and perhaps ever will be, to establish certain determinations. While some authors believe that there are only a few species, others (as Schleicher, Tausch, Host, &c.) seem to think "species tot numeramus, quot creata sunt individua." If, then, a botanist most favorably situated for the purpose finds it no easy matter rightly to understand the Willows of his own limited native country, how embarrassed must not a stranger be, who tries to form an exact idea of this intricate genus in a distant and extensive part of a new world, which he has seen only in one spot (California), and for a few weeks? But, as it may perhaps always be impossible for one person fully to examine, in a living state, and in their native regions, the Willows of Lapland, Switzerland, the Pyrenees, Siberia, Himalaya, and North America (not to speak of the tropical regions), and as it nevertheless is of advantage to science to have a synopsis of all the known species, constructed upon uniform principles, a botanist may hope to be favorably judged when he undertakes to publish his views of these plants, after having studied them in several of their natural districts, and in the largest collections.

For two years I occupied myself with the Willows in various regions of Lapland. I afterwards collected them in the *Riesengebirge* (Silesia), in Switzerland, and in many parts of the Continent, and in England. I have consulted the herbaria, as well as the botanical gardens, of Paris, Berlin, and Vienna; also the herbaria of M. De Candolle and of Sir W. Hooker, the latter the largest now existing, and especially rich on plants from North America. For many years I have wished to publish some general remarks upon this genus; and M. De Candolle has lately honored me with a request to elaborate it for his celebrated *Prodromus.*

But in arranging for such a work my annotations upon the Northern species, I could but know how imperfect is our knowledge of the North American forms. As the Willows especially belong to cold regions, why should they not be as numerous in America as in Europe or Asia? As they are with us so extremely subject to variations and to hybridizations (a fact now generally acknowledged), must it not be the same in the New World? To answer these and similar questions, our materials in Europe are not sufficient, and all determinations founded upon them alone must be imperfect, and liable to frequent mistakes. In this diœcious genus it is very important to be sure that the specimens, both of leaves and flowers, belong to the same species, and that the foliage, flowers, and fruit should be taken from the very same shrub. But in herbaria the specimens — gathered by travellers who generally care little for Willows — often are so imperfect, confused, and miserable, that they only serve to make the study more difficult and uncertain.

Looking into the American Floras, published by various authors since the time of Michaux, we find that the indigenous Salices of America (with the exception of a few of the most arctic) all have names totally differing from the European species. Now this was hardly to be expected, when the well-known fact is considered that the vegetation of a large part of the Northern regions is, I dare not say quite identical, but very uniform or homogeneous, all round the world. Hence, although the indigenous Willows in America generally are considered different from those in the Old World, we should look for a greater resemblance than has yet been recognized, not only in the higher arctic regions (as partially shown in Hooker's Flora Boreali-Americana), but also in the more southern parts.

And, in fact, my inquiries have persuaded me that the similarity or analogy in this respect is greater than is generally supposed. With my experience of the European Willows, which frequently vary from one extremity of size, form, and color to another, according to the area of the species (e. g. *S. nigricans*), and which in different countries not seldom have the most different aspects (e. g. *S. Lapponum* and *S. glauca* in Lapland and Switzerland), I could not be surprised to find many American Willows equally varying from ours, although certainly belonging to European types, or at least so analogous to their European relatives that they might be considered as subspecies of them, till we discover the intermediate forms which are the connecting links of that unbroken series which we may consider as constituting a true natural genus. This idea, is it anything more than my individual opinion? It must be proved by others; it must be ascertained by diligent, unprejudiced, and accurate researches upon the living species in America, and especially by botanists who have acquired a profound acquaintance with the European species, as older in the history of the science.

My esteemed correspondent, Professor Asa Gray, who has kindly promised to assist me in procuring materials for a more complete treatise upon this very difficult genus, has encouraged me to send him an enumeration of the American species already known to me, which may be brought to the notice of botanists of the United States generally, in the hope that they may be induced to make renewed and critical observations upon the species indigenous around them, and also to favor me with contributions of specimens, which are so greatly needed to perfect my contemplated revision of the entire genus for De Candolle's *Prodromus.*

I have tried to lay before the reader some of the reasons why I must consider several American species as very much allied to, or perhaps identical with, ours in the Old World. But neither time at present, nor the space at my command, has permitted me to treat the matter at the length requisite to prove the correctness of my opinion. I have also been obliged to restrict this communication to short diagnoses only for the new species here proposed, and to a few synonymes from the principal American Floras. Should this essay fulfil its purpose of directing the attention of the botanists of the United States to this diffi-

cult genus, and bring forth the materials and the observations needed to dispel the many remaining doubts, the author may perhaps hereafter find an opportunity of publishing, in the New World, a complete monograph of the North American Salices, and thus "*redit ad Dominum quod fuit ante suum.*"

A. AMERINA, *Fries.*

I. AUSTRALES. — Hæc tribus, staminibus numerosis, filamentis subfasciculatis basi sæpius hirsutis, antheris minutis rotundatis, squamis rotundatis tomentosis, capsulis plus minus longe pedicellatis et ovato-globosis, nectario subcirculari insignis, *Amygdalinis* omnino analoga, regionibus meridionalibus et tropicis fere priva videtur. Huc pertinent species omnes Africæ et Americæ Australis indigenæ, Indiæ Orientalis et Persiæ pleræque (*S. tetrasperma* et affines); nonnullæ (*S. Humboldtiana, S. Bonplandiana, S. Hartwegi*, etc.), Americam Centralem transgredientes, etiam Mexico australem incolunt.

1. S. NIGRA, *Marsh.; Hook. Fl. Bor.-Am.* 2, *p.* 198; *J. Carey in Gray, Man. ed.* 2, *p.* 417. S. ambigua, *Pursh.* S. Houstoniana, *Pursh.* S. Caroliniana, *Michx.* S. falcata, *Pursh* (S. Purshiana, *Spring.* S. ligustrina, *Michx. f.*).

2. S. LONGIPES, *Shuttlew. ined.:* pentandra; amentis lateralibus pedunculatis laxis; pedunculo foliato; capsulis ovato-globosis glabris, pedicello nectarium sexies superante; stylo subnullo; stigmatibus brevibus indivisis; foliis lanceolato-oblongis demum glabris subtus glaucis reticulato-venulosis exstipulatis.

Var. PUBESCENS (S. gongylocarpa, *Shuttlew.*): capsulis subcrassioribus fere longius pedicellatis; foliis utrinque hirsutis.*

HAB. Prope St. Mark's, Florida, *Rugel.*

Utraque forma non parum cum priori congruit, multis autem notis (foliis exstipulatis, etc.) ab ea differt.

3. S. AMYGDALOIDES, n. sp.: triandra; amentis lateralibus pedunculatis rigidiusculis; pedunculo foliato; capsulis ovato-conicis glabris, pedicello nectarium sexies superante; stylo subnullo; stigmatibus bre-

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* This is the S. subvillosa, *Ell. in Herb. Schweinitz, ex Nutt. N. Am. Sylva*, 1, *p.* 79, — a work to which Prof. Andersson had not access, — also mentioned in *Ell. Bot. S. Car. & Georg.* 2, *p.* 671, under *S. nigra.* A. G.

vissimis partitis; foliis late lanceolatis utrinque glaberrimis subtus pallidioribus, margine glanduloso-serratis exstipulatis.

HAB. Missouri, Fort Pierre, *Neuwied, in Herb. Vindob.*

Hæc species, præ cæteris affinibus, *S. amygdalinam* nostram latifoliam refert. Habitu quasi hybrida ex *S. lucida* et *S. nigra*, huic fructibus, illi foliis omnino similis.

II. FRAGILES, *Fries.*

4. S. (PENTANDRA) LUCIDA. — S. lucida, *Muhl.; Hook. l. c. p.* 198; *J. Carey in Gray, l. c. p.* 417.

Var. LATIFOLIA: foliis apice plerumque longe cuspidatis.

Var. OVATIFOLIA: foliis non vel abrupte cuspidatis. — Forma DENSIFLORA: capsulis condensatis majusculis, squamis subpersistentibus (L. Winipeg, *Herb. Benth.*).

Var. ANGUSTIFOLIA. — Forma LASIANDRA (S. lasiandra, *Benth. Pl. Hartw. p.* 335): squamis amentorum glandulosis; filamentis basi subpilosis (California, *Hartweg, J. M. Bigelow*). — Forma PILOSA: foliis subtus passim rufo-pilosis. (Columbia River; L. Winipeg; Fort Franklin.)

Primo obtutu hæc species a nostra *S. pentandra* non parum differt; comparatis autem formis e variis partibus Americæ et Europæ, affinitas ne dicam identitas negari non potest. Etiam apud nos folia adsunt longe cuspidata, ut et in America folia obtusiuscula, non lucida.*

5. S. FENDLERIANA, n. sp.: tri-pentandra; amentis pedunculatis foliatis erectis; squamis amenti masculi magnis margine glandulosis; capsulis ovatis glaberrimis, pedicello nectarium sexies superante; stylo evidenti; stigmatibus minimis integris; foliis ovatis acutis utrinque glaberrimis creberrime glanduloso-serrulatis; stipulis sat magnis glanduloso-serratis.

HAB. New Mexico, *Fendler* (Pl. N. Mex. no. 816); Rocky Mountains, *Geyer*, no. 287.

Habitu toto cum *S. lucida* maxime congruit; sed differt, capsulis brevibus longiùs pedicellatis, necnon foliis crebrius glanduloso-serrulatis, quibus notis etiam a *S. amygdaloide* dignoscitur, cui omnino analoga.†

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* Nuttall, in his N. Am. Sylva, supplementary to that of Michaux, Plate 18, has figured a form of *S. lucida* as *S. pentandra*, var. *caudata,* from the western side of the Rocky Mountains. A. G.

† This appears to be the *S. speciosa* of Nuttall (*Sylva*, 1, *p.* 58, *t.* 17), from Oregon. There is a much older *S. speciosa* of Hooker and Arnott, from Kotzebue's Sound. Vide no. 22. A. G.

6. S. Wrightii, n. sp.: amentis pedunculatis; pedunculo foliis 2 – 3 oblongis obtusiusculis instructo; squamis facillime deciduis; nectario basin pedicelli semicirculatim cingente; capsulis ovato-conicis glaberrimis sat longe pedicellatis, pedicello capsulam dimidiam superante gracili; stigmatibus sessilibus integris; foliis anguste lanceolatis longius acuminatis tenuissime glanduloso-serrulatis utrinque glaberrimis subtus pallidioribus; stipulis caducis; ramis erectis pallide testaceis nitidis.

Hab. New Mexico, *C. Wright*, Coll. 1851 – 2, no. 1877.

A cæteris hujus tribus speciebus differt foliis angustissimis (2 – 3-pollicaribus, vix 4 lin. latis) utrinque glaberrimis, amentis brevioribus et crassis (vix pollicaribus). A *S. alba vitellina*, cui sane proxima, foliis et capsulis longe pedicellatis facillime dignoscitur.

7. S. alba, *L.; J. Carey in Gray, Man. ed.* 2, *p.* 416. Var. S. vitellina, *Smith* (= S. Pamechiana, *Barratt*, sec. *J. Carey in Gray, Man. l. c.;* quam tamen ad *S. fragilem* e speciminibus ducerem). — Var. S. cærulea, *Smith.*

8. S. viridis, *Fries, Novit. p.* 283. S. fragilis, var. proteifolia, *Barratt in Herb. Hook.*

A. *S. alba* differt amentis longis acutis et flexuosis, ramulis subpendulis, foliis latioribus utrinque viridibus et lucidis. A *S. fragili*, ramulis tenacibus pendulis, foliis cuspide recta acutatis, maturis consistentia durioribus, sub prelo non nigrescentibus, amentis erectis.

9. S. fragilis, *L.; Hook. l. c.; J. Carey in Gray, Man. l. c.* — Var. S. decipiens, *Hoffm.:* foliis obtusiusculis; cortice ramulorum pallide testaceo. — Var. S. Russelliana, *Smith:* arbor excelsa; foliis maximis acutissime serratis.

III. Longifoliæ. Amenta in ramulis lateralibus annotinis elongatis valde foliatis terminalia; squamæ spathulato-ligulatæ, apice sæpissime glandulosa-denticulatæ. (Folia primaria pinnato-incisa!)

10. S. longifolia, *Muhl.; Hook. Fl. Bor.-Am.* 2, *p.* 149; *Gray, Man. p.* 147. S. rubra, *Richards* (*sec. Hook.*).

Jam cognitum est nullam fere aliam Salicis speciem (*S. cordata* et *S. vagante* forte exceptis) in America crescentem mire variationibus ludere. Statura nunc bipedalis, nunc 4 – 5-orgyalis (qualem in California ipse vidi), nunc stricte erecta arboris instar, nunc humifusa vel repens, rami longius viminei aut breves subtorulosi, cortice vario obducti; folia latitudine et longitudine, indumento et serratura eximie varia, ut etiam amenta. His omnibus perspectis species sequentes (*S. sessilifoliam, Hindsianam* et *S. taxifoliam*) tantum ut formas australes et occidentales ejusdem per Americæ regiones latissime dispersæ speciei proponere vellem: quam autem in serie contigua a formis maxime latifoliis et vegetis ad minimas, microphyllas et pumilas, membra adhuc desiderantur nonnulla, eas seorsim descripsi donec, quod hic autumavi, omnibus sit expertum. Inter formas autem numerosissimas *Salicis* vere *longifoliæ* hæc precipue notanda: —

Var. ANGUSTISSIMA: amentis laxifloris et eximie remotifloris; capsulis squamas acutiusculas hirsutas primo non excedentibus basi parum gibbis subcylindricis densissime sericeis breve pedicellatis; foliis angustissimis et argute dentatis exsiccatione fusco-nigrescentibus. — Hab. in Texas, *Berlandier*, No. 911, 3019, 2341, 2368); N. Mexico, *C. Wright*, Coll. no. 1875.

11. S. SESSILIFOLIA (*Nutt. in Herb. Hook.**): amentis masculis uncialibus crassiusculis cylindricis acutis densifloris; squamis oblongo-ovalibus filamentis triplo brevioribus et pilis albis staminibus brevioribus dense vestitis; antheris post anthesin fulvescentibus; foliis pollicaribus sessilibus exacte lanceolatis medio semipollicem latis acuminato-cuspidatis utrinque dense griseo-tomentosis (pilis sat longis subadpressis micantibus vestitis) integerrimis. — Hab. Oregon, *Nuttall, Lobb.*

⁎ HINDSIANA, *Benth. Pl. Hartweg, & Herb.:* amentis brevibus (vix semipollicaribus); squamis acutiusculis dense tomentosis; antheris pallide flavis; capsulis breve pedicellatis e basi gibba longe rostratis rugulosis glabriusculis; foliis anguste lanceolatis (medio 2½ – 3 lin. latis) margine integerrimis utrinque adpresse sericeis. — Hab. California, *Hartweg.*

Ad eandem seriem hæc ultima, regionum subtropicarum incola, etiam pertinet:

S. TAXIFOLIA, *H. B. K. Nov. Gen. & Spec.* 2, *p.* 22 (1817). S. microphylla, *Schlecht. & Cham. in Linnæa*, 6, *p.* 354 (1831): pulcherrima, ut mihi videtur, formis supra memoratis haud dubia in *S. longifoliam* sensim abiens.

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* Published by Nuttall in his *N. Am. Sylv.* 1, *p.* 68, 1842. A. G.

B. HELIX, *Fries.*

12. S. PURPUREA, *L.; Hook. l. c.; J. Carey in Gray, Man. p.* 415.

13. S. VIMINALIS, *L.; Hook. l. c.; Gray, Man. l. c.*

C. VETRIX, *Fries.*

I. TEMPERATÆ (*Subdaphnoideæ*).

14. S. ACUTIFOLIA, *Willd.* — Ramum foliatum tantum vidi.

15. S. (DAPHNOIDES) IRRORATA, n. sp.: amentis sessilibus perulis maximis primo bracteatis valde condensatis, masculis brevibus, fœmineis horizontalibus elongatis densifloris; capsulis sessilibus crasse conicis glaberrimis; stylo producto; stigmatibus integris; foliis lanceolatis utrinque viridibus; ramis densissime glauco-irroratis.

Hab. N. Mexico, *Fendler*, no. 812.

Nostræ *S. daphnoidi* ita est similis, ut nullis notis nisi amentis eximie condensatis et foliis (novellis?) integerrimis utrinque viridibus ab ea distingui possit. Squamæ amenti masc. pilis brevibus aureis vestitæ; squamæ amenti fœm. pilis sat brevibus griseis ciliatæ; unde amenta fœm. non ut in vera *S. daphnoide* longe pilosa conspicuntur.

16. S. ERIOCEPHALA, *Michx. Fl.* 2, *p.* 225; *J. Carey, in Gray, Man. p.* 414.

E Salicibus Americanis hæc mihi fere maxima obscura. Specimina numerosa, inter se eximie diversa, nunc *S. eriocephala* Michx., nunc *S. crassa* Barratt, nunc *S. prinoides* Pursh (Hook. l. c. p. 150), nunc *S. conifera* Willd., nunc immo *S. myricoides*, a me examinata, confusionem tantum adhuc majorem reddiderunt, nec e diagnosibus auctorum quidquam certi eruere potui. Exstant specimina gemmis maximis oblique conicis, stipulis semicordatis et serratis, foliis sat longe petiolatis (petiolo basi dilatato gemmam amplectente) demum rigidis subtus glaucis, margine argute serratis, supra saturate viridibus et lucidis nervis conspicuis percursis, amentis omnino nudis, masculis e gemmis erumpentibus pilis fulvo-aureis densissime villosis, squamis et staminibus pilis chryseis absconditis, amentis fœmineis pilis cinerascentibus obtectis, stylo elongato, etc. — ita omnino cum nostra *S. daphnoide* congruentia, ut formis numerosis quibus ea apud nos mirum in modum luditur perspectis, hanc ut formam parum aberrantem haberem. Obstant autem rami rarissime glaucescentes, folia margine remotius serrata, præcipue autem capsulæ multo angustiores, distincte pedicellatæ et sericeo-pubescentes. Exstant etiam specimina quædam, ad *S. discolorem* non indubie transeuntia, amentis magnis laxis et rarifloris, capsulis sat longe pedicellatis foliis fere ut in *S. grandifolia* nostra, obovato-elongatis margine repandis et sinuato-dentatis. Maxime autem memorabilis videtur quadam *grisea*, foliis utrinque hirtis subtus subferrugineo-pilosis, ramis cinereo-villosis et amentis iis *S. cinereæ* similibus, sed stylo producto distincta. Quibus omnibus sequitur me de hac specie vix quidquam certi cognoscere; quare omnes rogo velint specimina varia diligenter et accurate observare.

17. S. BIGELOVII, *Torr. in Herb. Hook.* [*& in Bot. Pacif. R. R. Expl.* 4, *p.* 139]: amentis sessilibus bracteis facillime deciduis paucis suffultis; capsulis ovatis brevibus obtusiusculis glabris, pedicello nectarium bis superante squamam subrotundam pilosam subæquante; stylo elongato; stigmatibus brevibus erectis bipartitis; foliis ovali-obovatis integerrimis subtus adpresse flavido-tomentosis nigrescentibus.

Hab. California, *J. M. Bigelow*, 1854.

Quoad foliorum forma et indumentum (quod tamen fusco-flavescens) et amenta ebracteata densiflora similitudinem quandam cum *S. Coulteri* habet: capsulæ autem iis *S. hastate* similiores. Unicum tantum specimen vidi.

18. S. LASIOLEPIS (*Benth. Pl. Hartweg. & Herb.*): amentis sessilibus nudis adscendentibus; squamis cuneato-subrotundis tomento densissimo et brevi obtectis capsulas fere occultantibus; capsulis acutis glaberrimis, pedicello nectarium bis superante; stylo mediocri; stigmatibus crassis brevibus integris; foliis lanceolatis vel late lingulatis acutis supra glaberrimis subtus ferrugineo-glaucis margine subsinuatis.

Hab. California (near Monterey), *Hartweg*, no. 167.

Pulcherrima species, *Vetrices* et *Capreas* quodammodo ambigua. Arbor dicitur 20 – 25-pedalis: rami crassiusculi, atri, novelli tomentosi. Folia 3 – 4-pollicaria, sæpius semiuncia latiora, supra nitide viridia, subtus glauca, indumento ferrugineo juxta nervos relicto colorata. Amenta mascula fere bipollicaria, erecta, subflexuosa: squamæ atræ, rotundatæ, basi angustatæ, pilis aureo-fulgentibus vestitæ; filamenta squamas duplo superantia; antheræ minutæ, oblongæ, etiam aureæ. Amenta fœminea vix breviora, sed subangustiora; squamæ capsulas lineales flavo-virides supra medium tegentes, densissimæ cano-tomentosæ.

19. S. COULTERI, n. sp.: amentis omnino sessilibus bracteis 2 – 3 suffultis; squamis fulvis pilis albis longissimis dense hirsutis; foliis

oblongis supra obscure viridibus costa alba, subtus vellere lucido argenteo densissime tomentosis; ramis angulatis dense griseo-tomentosis.

Hab. California, *Coulter*.

Hæc species, cujus tantem tria specimina foliis rite evolutis et amentis masculis prædita vidi, non absque dubio affero: cum nulla a me cognita attamen confundenda, ab id præcipue insignis, quod *S. eriocephalam* cum *S. lanata* (mediantibus *S. Hookeriana* et *S. speciosa*) serie naturali aperte connectit.

II. ARCTICÆ vel SUBARCTICÆ.

20. S. HOOKERIANA, *Barratt in Hook. Fl. Bor.-Am.* 2, *p.* 145, *t.* 180.

Amentis masculis est *S. daphnoidi* subsimilis, amentis fœmineis *S. hastatæ*, foliis autem *S. lanatæ !*

21. S. LANATA, *L.*, var. AMERICANA: capsulis hirsutiusculis.— Forma *α*. S. Barrattiana, *Hook. l. c. p.* 146, *t.* 145: capsulis sericeis; foliis tomentosis magnis, amentis sæpius lateralibus. *β*. S. Richardsoni, *Hook. l. c. p.* 147, *t.* 182: capsulis et foliis glabriusculis; foliis minoribus; amentis subterminalibus.

In Lapponia *S. lanata* sub multis formis frequens occurrit; sunt quædam his Americanis tam similes ut nec habitu nec notis ullis distingui possint. Exstant apud nos formæ numerosæ ad *S. glaucam*, sed optime ad *S. hastatam* accedentes, quarum folia glabrescunt, et amenta lateralia fiunt. Americana potius ad *S. Lapponum* vergit; hæc etiam multo humilior crescere videtur (præsertim *S. Richardsoni*). E Siberia partibus variis eadem variationes etiam adsunt.

22. S. SPECIOSA, *Hook. & Arn. Bot. Voy. Beech. p.* 130; *Hook. l. c. p.* 145; *Seemann, Bot. Voy. Herald, p.* 40, *t.* 10.

Quanquam Salici cuidam, *S. amygdalinæ* affini, hoc nomen jam 1818 imposuit Host, id tamen huic speciei Americanæ conservandum censeo, ut pote Salici omnium in regionibus borealibus crescentium facile speciosissimæ aptissimum.

23. S. LAPPONUM, *L.; Hook. l. c. p.* 151? S. Stuartiana, *Smith, Hook. l. c.*

Fateri debeo me nulla specimina Americana hujus speciei certe vidisse. Non sine hæsitatione permulto huc refero Salicem eam "pulchram," de qua Chamisso (Linnæa, 6, p. 543) in America arctica occidentali pluries a se lecta, mentionem fecit. Amenta sessilia: capsulæ non pedicellatæ, sed folia fere ut in *S. phylicifolia* utrinque acutata, viridia, subtus pallidiora, glaberrima: stipulæ persistentes lineares. Unicum tantum specimen ex herb. Berolinensi vidi. Notandum ut *Salicem Lapponum*, alpium summarum incolam, etiam folia nonnunquam habere glabrescentia.

24. S. CANDIDA, *Willd.; Hook. l. c. p.* 148; *J. Carey in Gray, l. c.*

D. CAPREA, *Fries.*

I. CINERASCENTES, *Fries.* Stigmata sessilia! Amenta præcocia, vix pedunculata.

25. S. (CAPREA) CAPREOIDES, n. sp.: amentis sessilibus bracteis paucis et minutis primo suffultis densifloris; capsulis pedicellum quinquies superantibus sericeis; foliis obovatis vel oblongis basi angustatis subtus glaucescentibus pilis rufescentibus villosis denique (nervis exceptis) glabris.

Hab. California (*Coulter*) et Oregon, *Herb. Hook.*

S. caprea vera Europæa, quantum scio, in America nullibi reperta, hæc forma eam ibi optime representat. Quod ad fructificationis partes vix ulla exstat differentia essentialis. Amenta mascula tamen angustiora, sed fœminea crassiora, utraque quam in nostra breviora; squamæ fere majores, atratæ, obovato-spathulatæ; capsulæ e basi gibbo fere cylindricæ, 2½ lin. longæ; stigmata sessilia erecta. Folia novella utrinque rufo-hirsuta, subtus etiam vellere albo plus minus denso obtecta, denique denudata, integerrima, dura. Gemmæ, ut in *S. caprea* vera, subglobosæ glabræ; rami sæpius obscuri et glabri. — Proxima huic sine dubio est *S. brachystachys;* quæ tamen differt amentis adhuc brevioribus, foliis densissime albo-velutinis.

26. S. CINEREA, *L.?* — In herbaria Hookeriano specimina adsunt duo, quantum videre possum ad hanc speciem referenda, quibus annexus erat ramus foliis parvis glabris, omnino iis *S. rostratæ* simillimis, obtectus. Vereor ne confusione quadam commixta sint?

Hab. "Thickets along rivulets, Columbia River valley, near Fort Colville; 15 – 20 feet high, shrubby, *C. A. Geyer.*"* Num *S. caprea* vel *S. cinerea* hic crescit?

27. S. (AURITA) BRACHYSTACHYS, *Benth. Pl. Hartweg, & Herb.:*

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* These specimens are described, under the name of *S. grisea?* in Hook. Kew Jour. Bot. 7, p. 372. A. G.

amentis sessilibus nudis brevibus ovatis; squamis pilis longissimis sericeis dense vestitis; capsulis villosis acutatis, pedicello nectarium 4–5-ies superante; stylo nullo; stigmatibus longis integris divaricatis; foliis obovatis subtus densissime velutino-tomentosis demum glabrescentibus rufescenti-nervosis.

Hab. California (woods near Monterey), *Hartweg*, no. 1957.

Frutex dicitur 4-orgyalis, sat similis videtur prioribus; sed differt, amentis semiuncialibus, squamis mediocribus rufescentibus pilis duplo vel triplo longioribus densissime sericeis, pedicello breviore, foliis 1½ unc. longis supra medium unciam latis subtus molliter velutinis. E nostris speciebus in Europa indigenis *S. aurita* L. sine ullo dubio huic tam similis ut hanc facile subspeciem ejus haberem.

Sub nomine *S. Scoulerianæ* Barratt, *Hook. l. c. p.* 145 in herbario Hookeri vidi specimina duo florentia ad *S. brachystachym* absque ullo dubio pertinentia, et specimen foliatum *S. Sitchensis* Sanson. Hoc nomen itaque e Salicum turba excludendum.

28. S. VAGANS, Anders. — Qui *S. depressam* Scandinaviæ, *S. Starkeanam* Rossiæ et Borussiæ, et *S. rostratam* Americæ Borealis eamque formas attente, nulla certa opinione præoccupatus, comparare studet, non potest quin eas omnes ad unam eandemque Salicum speciem pertinere credat. Hoc mihi saltem, specimina fere innumera, e variis terris inspicienti, omnino persuasum habeo. Nominibus jam allatis formas varias tantum spectantibus, *vagantis* nomine speciem notare volui, quæ per terras plurimas septentrionalis late vagatur, quæ insuper notis admodum vaga est. Variat statura, de qua Linnæus in Flora Lapponica, no. 361 "arbor parva," sed in Flora Suecica "arbuscula ad terram depressa": variant folia nunc glabra nunc villosa, nunc magna nunc parva, nunc lanceolata nunc ovata vel obovata: rarissima autem variant amenta laxiflora, capsulis angustis (glabris seu hirtis) subcylindricis longissime pedicellatis et stigmatibus coronatis sparsim ornata. His præmissis hujus speciei sequente modo proponendas censeo: —

1. *Cinerascens:* foliis velutinis.

Var. *α*. LINNÆANA (cfr. *Fries, Nov. Mant.* 1, *p.* 59): foliis plerumque obovatis supra demum glabratis. *Linn. Fl. Lapp. no.* 361 (sec. *Fries*). S. livida *β*. cinerascens, *Wahl. Fl. Lapp. no.* 273. S. depressa, *α*. cinerascens, *Fries, l. c. p.* 57. S. depressa, velutina, *Koch.* S. sphacelata, *Smith.*, nomen ambiguum!)

Forma ELATA: orgyalis, Wahl. l. c.

" DEPRESSA: foliis crassioribus utrinque tomentosis. S. depressa, *L. Fl. Suec.* S. livida *β.* in alpibus, *Wahl.; Fries, l. c.*

Hab. ex alpibus (forma depressa) juxta flumina (forma elata) in regiones sylvaticas Lapponiæ descendens.

Var. *β.* OCCIDENTALIS: arbor 4–15-pedalis; foliis plerumque lanceolatis demum rigidis et læviusculis sinuato-crenatis (fere ut in *S. caprea*). S. rostrata, *Richards.; Hook. l. c.; Gray, l. c.*

Hab. per Amer. Sept. omnem et in Siberiæ partibus orientalibus.

2. *Glabrescens:* foliis glaberrimis lucidis subtus pallidioribus.

Var. *α.* INTERMEDIA: frutex parvus et humilis; foliis sæpius late obovatis subcoriaceis; amentis masculis tenuibus; staminibus flavis; pedicello capsularum nectarium sexies superante.

Forma LIVIDA: foliis subtus lucido-glaucis; capsulis glabris vel sericeis, S. livida, *α. Wahl.* S. depressa, *β. Fries.*

" BICOLOR: foliis subtus glaucis haud lividis. S. depressa, *γ. Fries, l. c.*

Hab. in regionibus mediis (*livida*) et meridionalibus (*bicolor*) Sueciæ.

Var. *β.* ORIENTALIS: frutex altior; foliis majoribus utrumque glaberrimis margine sinuatis; amentis masculis crassioribus; staminibus fulvis; capsularum pedicello nectarium sæpe novies superante. S. Starkeana, *Willd.*

Hab. in Silesia et prope Kœnigsberg Borussiæ, necnon per Rossiam medium et septentrionalem.

Et J. Carey in Gray, Man. l. c., et Hooker hanc speciem in America valde esse variabilem affirmant. Formas majores foliis fere ut in *S. caprea* longis (sed multo angustioribus), obovatis et acutis, margine sinuatis, textura duris, subtus tomentosis, supra obscure viridibus in formas minores foliis lanceolatis aut obovato-oblongis, junioribus rufescenti-pellucidis, nervis subtus elevatis costatis abire videmus, omnino ut s. d. *S. depressa* in Scandinavia ubi forma *cinerascens* altitudinem orgyalem sed forma *livida* vix bipedalem attingit. Has formas *lividas* et *bicolores* ex America non reperimus. Amenta mascula *S. rostratæ* omnino ut in *S. Starkeana*, i. e. quam in vera *S. depressa* paullo longiora et crassiora, pilis fulvis squamarum magis hirsuta; amenta fœminea vulgo quam in nostra longiora, sed capsulæ omnino æquales. Etiam in America margines sylvarum et pratorum inhabitare dicitur.

29. S. Geyeriana, n. sp.: amentis breve pedunculatis bracteis paucis suffultis brevibus subramifloris; capsulis ex ovata et crassa basi conicis tenuiter sericeis, pedicello nectarium sexies superante; stigmatibus sessilibus cruciformibus; foliis lineari-lanceolatis planis utrinque molliter tomentosis integerrimis. [S. rostrata, *Hook. in Kew Jour. Bot. l. c.*]

Hab. Missouri v. Oregon, *Geyer*, coll. No. 286!

Priori valde similis, sed differt habitu toto, ramis interdum glaucescentibus, foliis (novella tantum vidi!) multo angustioribus, nec ullo modo obovatis, integerrimis, sed præcipue amentis fœm. triplo brevioribus subrotundis, nec cylindricis, et capsulis e basi valde crassa acutatis. Amenta mascula etiam breviora et crassiora; stamina magis aureofulva. Habitu amentorum propius ad *S. repentem* appropinquatur.

II. Virentes. Amenta sæpius pedunculata, foliis seu bracteis suffulta: capsulæ brevius pedicellatæ, stylo producto: folia exsiccatione non nigrescentia.

30. S. Drummondiana, *Barratt in Hook. Fl. Bor.-Am.* 2, *p.* 144.

Species pulcherrima, ramis elongatis nitidis castaneis vel rufis, amentis sessilibus, et capsularum forma, magnitudine, et indumento sequenti proxima et valde similis; sed differt abunde foliis (que iis *S. laurinæ* haud dissimilia) subtus vellere densissimo candido lanatis. Stylus in capsulis junioribus stigmatibus bifidis æquilongus, in capsulis adultis magis productus videtur, brevior tamen ac in *S. discolore.*

31. S. (phylicifolia) discolor. — S. discolor, *Muhl.; Hook. l. c.; J. Carey in Gray, l. c. p.* 414. S. phylicifolia, *J. Carey, l. c. p.* 416?

Specimina pleraque numerosa, quæ attente examinavi, parum differt a vera *S. phylicifolia,* qualis in Europæ alpestribus crescet vulgatissima et eximie polymorpha, eique saltem exacte analoga. Folia quam in nostra majora, adulta rigidiora et margine irregulariter sed non profunde repando-serrata, stipulæ in surculis et ramis novellis vegetis sat conspicuæ, amenta omnino præcocia, capsulæ angustæ sericeæ, et squamæ atræ longe pilosæ. In pluribus herbariis hæc species et *S. eriocephala* confusæ. Nullam aliam *S. phylicifoliam* ex America vidi, nisi forsan sequentem. — Nonne species apud nos loca alpina potissimum amans, quum in Americæ regiones magis temperatis inhabitat, hoc modo mutatur?

32. S. phylicoides, n. sp.: amentis subsessilibus elongatis crassi-

usculis; capsulis breve pedicellatis ovatis longe acutatis tenuissime pubescentibus; stylo elongato integro; stigmatibus brevissimis indivisis; foliis lanceolatis acuminatis basi angustatis margine integris subtus pallidioribus nec glaucis. — Forma LATIFOLIA: foliis 3 – 4-pollicaribus 1½ poll. latis margine subsinuatis. Forma ANGUSTIFOLIA: foliis 1 – 2-pollicaribus ½ poll. latis lanceolatis integerrimis.

Hab. in Arctica America occidentali (Avatscha Bay, *Seemann, Herb. Hook.*).

En aliam speciem mihi valde obscuram! Est ita inter *S. discolorem* et *S. cordatam* intermedia ut fere eodem jure ad quamvis ut subspecies relata esse possit. Cum priori congruit amentis longis, capsulis pubescentibus, stylo producto, foliis elongatis acutis basi angustatis; sed differt, capsulis multo brevius pedicellatis, stigmatibus indivisis, et foliis adultis vix rigidis nec subtus glaucis. Cum *S. cordata* communia habet stipulas basi latiores, folia subtus venulosa, et capsulas viridiusculas. — Folia 2 – 3-pollicaria: amenta fere eadem longitudine: capsulæ 2 – 3 lineas longæ.

33. S. MACROCARPA, *Nutt. in Herb. Hook.:* amentis pedunculatis foliatis erectis; capsulis breve pedicellatis conicis glaberrimis; stylo mediocri; stigmatibus integris; foliis exstipulatis lanceolatis integris glaberrimis subtus pallidioribus.

Hab. [Oregon? *Nuttall*] Hudson's Bay, *Burke.*

De hac specie iterum non parum sum incertus cui potissimum proxima censenda. Videtur frutex sat altus, ramis glabris. Folia iis *S. phylicifoliæ* simillima, 1½ pollicem longa, semiunciam lata, acuta, basi acutata, matura rigidiuscula. Amenta fœminea pedunculo foliis 3 – 4 rite evolutis instructo infixa, pollicem longa, subramiflora. Capsulæ ut in *S. phylicifolia* nostra 2 lin. longa. — A præcedentibus longe differt amentis pedunculatis et foliatis: cum sequentibus non multa communia, nisi cum *S. glaucæ* formis denudatis.*

34. S. CORDATA, *Muhl.; Hook. l. c.; J. Carey in Gray, Man. p.* 415.

In Europæ hortis non raro colitur salix hæcce pulchra, foliis magnis rigidis basi profunde cordatis, apice cuspidatis margine acute serratis, insignis. Qui hanc formam tantum inspexit vix ullam ejus affinitatem cum *S. hastata* nostra sibi fingeret, licet amenta, et mascula et fœminea huic omnino similia conspiciuntur, ceteras autem modificationes, quibus dilata est terra Americana usque ad septentrionem summum, quum videat, facillime intelliget has duas sibi valde esse analogas. Apud nos frutex *S. hastatæ* variat nunc orgyalis (in convallibus alpium), nunc (in campis alpium elevatis) repens, prostratus, et bidigitalis: folia sunt latissime ovata, acuminato-cuspidata, acute serrata, stipulis magnis cordatis ornata, nunc autem anguste lanceolata integra exstipulata. Prorsus eædem modificationes etiam ex America vidi, quare eas hoc modo serie analoga disponere vellem: —

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* In his N. A. Sylva, 1, p. 67, Nuttall gives a character, but no figure, of this species. He calls it the "Western Pond Willow," and says it is closely related to *S. grisea.* He has omitted to mention the habitat. A. G.

S. hastata,			*S. cordata.*
malifolia, Sm.:	foliis cordatis stipulis magnis,	=	*rigida,* Muhl.
elegans, Hort:	foliis ovatis, stipulis mediocris,		*myricoides,* Muhl.
alpestris, Fries:	foliis lanceolatis, stipulis nullis,		*subarctica.*

S. cordata autem a *S. hastata* plerumque capsulis longius pedicellatis dignoscitur: cæterum omnibus partibus simillimæ, præsertim foliis rigidis subtus dense venulosis (character his speciebus valde singularis). Sub hac specie duas formas attulit Hooker, l. c.: 1. *S. balsamifera,* Barratt; 2. *S. Mackenziana,* Barratt. Quantum e speciminibus in herb. Hook. judicare possum *S. balsamifera,* cujus ramus foliis tectus tantum adest, ad *S. acutifoliam,* W. pertinet. Ramus cortice cœrulescenti-castaneo obductus. Stipulæ lanceolatæ, curvatæ; gemmæ magnæ acutæ; folia fere 4-pollicaria, semiunciam lata, argute sed remotiuscule serrata, subtus glaucescentia. *S. Mackenziana* mihi hybrida proles ex *S. cordata* et *S. vagante* (*rostrata*) videtur. A priori habet folia glaberrima, viridia, elongato-cuspidata, capsulas basi gibbas glabras, stylum brevem sed evidentem; a posteriori foliorum forma magnitudinem et consistentiam, capsulas longissime pedicellatas.

35. S. ADENOPHYLLA, *Hook. Fl. Bor.-Am.* 2, *p.* 146.

Est sine dubio *S. hastatæ* valde affinis: congruit enim cum ea, foliis subcordatis duris subtus reticulato-venosis argutissime serratis, stipulis magnis, pedunculis foliatis, capsularum forma et colore; sed differt abunde, foliis lana sericea densa primo obsitis, serraturis elongatis glanduligeris, capsulisque brevius pedicellatis.

36. S. MYRTILLOIDES, *L.* S. pedicellaris, *Pursh; Hook. l. c.; J. Carey in Gray, Man. l. c.*

Jam cl. Tuckerman, in The American Journal of Sciences and Arts, Vol. 45 (1843), p. 37, observavit speciem Americanam cum Lapponica valde congruere, nec possum quin ei omnino assentiar. Apud nos etiam species est vere elegantissima foliorum forma consistentia et colore, nec non capsulis statim ab omnibus dignata. In America adhuc magis luxurians videtur, folia nempe multo majora et ovalia. Ad nostram certissime se habet ut *S. rostrata* ad *S. depressam!*

III. NIGRICANTES, *Fries.*

37. S. BARCLAYI, n. sp.: pedunculo foliato; amentis incurvatis densifloris longe pilosis; capsulis glabris conicis in stylum longum integrum attenuatum productis, pedicello nectarium vix duplo superante; stigmatibus profunde bipartitis; foliis rotundato-ovalibus brevissime apiculatis supra parcissime pilosis vel glabriusculis subtus pallidioribus denudatis reticulato venulosis; stipulis ovatis acutis serratis.

Hab. in America boreali-occidentali: Kodiak, *Barclay* (*Herb. Hook.*).

Species ob id præcipue memorabilis, quod *S. hastatæ*, *S. nigricanti*, et *S. glaucæ* simul sit affinis. Cum *S. hastata* congruit, amentis pedunculatis, squamis longe cinereo-pilosis, capsulis obscure viridibus glabris, stylo producto, foliis subtus subglaucescentibus et pulcherrime reticulato-venulosis, stipulis denique latis serratis; cum *S. nigricante* habitu, foliis exsiccatione nigricantibus et subtus (sub lente) crebre albo-punctulatis; cum *S. glauca* capsulis subsessilibus, pedunculo foliis 5 – 6 cæteris subsimilibus instructo, et consistentia foliorum. Ob hanc variam affinitatem locus in dispositione methodica difficilis determinatu.

IV. ARGENTEÆ, *Fries.*

38. S. SITCHENSIS, *Sans. ex Ledeb. Fl. Ross.* 3, *p.* 609.

Hab. in America boreali-occidentali: Sitcha, *Mertens;* Oregon, *Scouler;* et juxta Columbia River, *Hinds.*

Jam sub *S. brachystachya* observavi specimina *S. Sitchensis* in herbario Hookeriano *S. Scouleriana* appellata cum aliis esse confusa.

39. [S. SERICEA, *Marsh.; J. Carey in Gray, Man. l. c. p.* 414.] S. grisea, *Muhl.; Willd., etc.*

Locus in dispositione methodica ambiguus. *S. rubræ* nostræ primo subsimilis ob id ad Helices interdum ducta, ab iis amentis haud longe pilosis, staminibus discretis, et capsulis pedicellatis longe diversa. Amenta, præcipue mascula, parva subrotunda. Maxime affinis est sequenti, et per eam *S. repenti* nostræ.

40. S. PETIOLARIS, *Smith; J. Carey in Gray, Man. l. c.*

Amentis et foliis præsertim junioribus *S. repenti* L. vel potius *S. rosmarinifoliæ* L. sat similis. Capsulæ, quæ in [*S. sericea*, Marsh. seu] *grisea*, Muhl. obtusissimæ et stigmatibus sessilibus coronatæ, in hac ovato-rostratæ stylo distincto apiculatæ: squamæ in priore obtusæ vel truncatæ, apice summo atratæ; in hac acutæ, superne infuscatæ.

41. S. HUMILIS, *Marsh.; J. Carey in Gray, Man. l. c.* S. Muhlenbergiana, Barratt, et S. conifera, *Muhl.* sec. *Gray, Man. l. c.*

E *S. cinerea* et *S. Smithiana* quasi composita videtur. Ab utraque foliis amentis et capsulis aliena. *S. tristis*, huic maxime affinis, aperte differt foliis utrinque opace cinereis, amentis fœmineis subglobosis, et capsularum stylo evidenti.

42. S. TRISTIS, *Ait.; J. Carey in Gray, Man. l. c.* — Var. MICROPHYLLA: foliis semiuncialibus; amentis globosis. Fruticulus parvus.

43. S. REPENS (*L.?*), *J. Carey in Gray, Man. p.* 418. S. fusca (*L.*), *Hook. l. c.*

Nullam veram *S. repentem* ex America in herbariis vidi. *S. repens*, Bigel. Fl. Bost. (*S. fusca*, Oakes) quum Tuckerman, l. c. *S. ambiguam* Ehrh. habet, ab utraque diversa, ad *S. arbusculam* referenda.

44. S. GRACILIS, *Anders.* (= S. rosmarinifolia (*L.*), *Hook. l. c. p.* 148): amentis lateralibus bracteis paucis deciduis suffultis; capsulis ovato-cylindricis obtusis tenuiter griseo-puberulis, pedicello nectarium octies superante; squamis lingulatis apice infuscatis; stigmatibus stylo brevissimo duplo longioribus integris; foliis angusto-linearibus planis integerrimis basi longe angustatis latitudine fere decies longioribus subtus pallidis glabris.

Hab. Saskatchawan, *Drummond, Richardson.*

Var. ROSMARINOIDES: foliis apicem versus serrulatis marginibus acutiusculis subrevolutis. — Hab. Durham County [New Jersey?], *Herb. Hook.*

Ab omnibus mihi cognitis speciebus bene dignoscitur foliis et capsulis. Quasi hybrida e *S. vagante* et *S. myrtilloide* videtur. A *S. rosmarinifolia* certissime longe recedit capsulis valde pedicellatis, a *S. vagante*, foliis linearibus elongatis. — Varietas, ut etiam nostra *S. gracilis* "*S. rosmarinifolia*, Barratt" inscripta, multo magis ad *S. rosmarinifoliam* veram accedit. Obstant autem capsulæ longissime pedicellatæ!

E. CHAMÆLIX, *Fries.*

I. FRIGIDÆ, *Koch.*

45. S. GLAUCA, *L.* — Hæc species in Lapponia et Silesia innumeris formis (*S. lanatæ, nigricanti, myrsinitidi* et aliis affinibus) ludens vulgatissima, et jam in Helvetiæ alpibus aliena facies (*S. sericea*, Vill. *S. albida* et *S. elæagnoides*, &c.) se induens, in arcticis regionibus Americæ habitu externo vix nostræ similis exstat. Specimina tamen a Seemann in parte occidentali et a Lyall in Disco Island lecta, necnon e Rocky Mountains reportata, cum nostris tamen ita congruunt ut de affinitate non dubitari licet. Folia nunc utrinque molliter villosa et incana, nunc denudata subviridia; amenta semper foliato-pedunculata; capsulæ brevius pedicellatæ. Huic certissime ut forma tantum associanda: —

Var. VILLOSA (S. villosa, *D. Don?; Hook. l. c. p.* 144): foliis tenuioribus supra glaucis sparse pilosulis elevato-venosis; stipulis subpersistentibus lanceolato-linearibus; amentis sat longis erectis laxiusculis subramifloris; capsulis vix demum denudatis; stylo producto integro; stigmatibus brevibus cruciatis. — Hæc forma speciei maxime vegeta videtur. Etiam in Lapponia omnino similis occurrunt specimina (*S. glauca appendiculata*, Wahl.) ibique nullo crescendi modo a vera *S. glauca* distingui possunt.

* S. DESERTORUM, *Richards.; Hook. l. c. p.* 151: amentis brevissimis (semipollicaribus) subglabris densifloris; capsulis ovatis dense lanatis squamis ovalibus maxima parte obtectis; stylo bipartito fusco; foliis anguste oblongis rigidis subtus plus minus albo-tomentosis subglaucescentibus costa prominente flava et nervis elevatis subscrobiculatis supra sæpius viridibus lucidis.

Insignis sane ut forma in orbe vetere quantum scio nondum observata. Fruticulus videtur 1-2-pedalis: rami breves, robusti, foliis et amentis condensatis onusti. Squamæ sat magnæ capsulas magnam partem occultantes. Stamina fulvo-aurea. Folia iis *S. repentis* haud absimilia. Transitus autem ad normalem *S. glaucam* nonnunquam reperti. Videtur itaque hujus modificatio maxime frigida.

Monstrositatem hujus formæ, ex Minto Inlet ab Anderson lectam, vidi, ramis elongatis foliatis apice spicigeris aberrantem.

46. S. ARCTICA, *R. Br.; Hook. l. c. p.* 152.

Species sane difficilis determinatu, quasi inter *S. Myrsinitidem* et *glaucam* prorsus media, et formas plures ambiguas amplectens. A *S. Myrsinite* habet amenta plus minus elongata et spissa, squamas vulgo infuscatas, stylos semper longos, tenues, piceos vel atros, integros; a *S. glauca* folia tenuiora virescentia, plus minus hirsuta, capsulas incano puberulas. Ab utraque tamen differt, trunco procumbente ("frutex depressus," *Br.*), ramis adscendentibus, foliis sparsis longius petiolatis vere herbaceis vulgo obovatis integris, venis parum elevatis rugulosis, subtus glauco-opacis, amentis utriusque sexus spurie terminalibus, i. e. ramulos breves villosos foliatos terminantibus. Vereor ne sub nominibus variis (*S. Myrsinites, S. retusa, S. ovalifolia, S. polaris,* etc.) formæ variæ hujus speciei ab auctoribus sæpe descriptæ sint? Notabiliores sunt:

Var. SUBPHYLICIFOLIA: foliis angustatis acutatis utrinque glabriusculis. — Hab. Norton Sound, *Seemann.*

Var. SUBRETICULATA: trunco et ramis longe procumbentibus apice tantum foliiferis; foliis elongato-obovatis glabriusculis subtus reticulato-venulosis; amentis (terminalibus) 2-3-pollicaribus. — Hab. Hudson Bay, Mackenzie River, etc.

Var. SUBPOLARIS: biuncialis; ramis apice folia 3-5 emittentibus quibus conditur amentum semipollicare; squamis atris truncatis emarginatis. Hab. in litore maris arctici (Minto Inlet, *Anderson*).

S. obovatam, Pursh (Hook. herb.) a *S. arctica* distinguere nequeo.

47. S. SUBCORDATA, *Anders.* = S. cordifolia, *Pursh, Hook. l. c. p.* 152, p. p. (altera pars ad *S. alpestrem* pertinet!): amentis lateralibus pedunculatis foliatis; capsulis sericeis ovatis sessilibus; stylo bifido; stigmatibus partitis divaricatis; foliis rotundatis seu ovalibus basi cordatis vel subangustatis utrinque glabris subtus pallidis viridibus venoso-reticulatis herbaceis stipulatis.

Hab. "Rocky Mountains," *Drummond.*

Frutex parvus, ramis erectiusculis nitidis castaneis, gemmis magnis. Folia adulta sæpe biuncialia, longe petiolata (petiolo flavo lucido), costa et nervis subtus prominentibus reticulata, margine obsolete glanduloso-serrulata: stipulæ cordatæ. Amenta semipollicaria, crassiuscula. Quoad habitum quasi hybrida a *S. cordata* (cujus folia habet, sed breviora) et *S. glauca* (amenta!).

48. S. ALPESTRIS, *Anders.:* amentis vel pseudo-terminalibus pedunculatis foliatis; capsulis subsessilibus ovatis albo-tomentosis vel subglabratis; nectario vix basin capsulæ superante; stylo producto sæpe ad

medium fisso; stigmatibus bifidis, laciniis revolutis; foliis oblongis vel subovalibus vel obovatis ut plurimum villosis demum glabratis. — Hoc nomine formas varias comprehendo, quæ, ad unam speciem certissime referendæ, in variis terris suis nominibus appellatæ fuerunt. Sunt: —

α. PYRENAICA. S. Pyrenaica, *Gouan!* In alpibus Pyrenæis.

β. HELVETICA. In Helvetia.

γ. NORVEGICA. S. Pyrenaica var. Norvegica, *Fries.* In Scandinaviæ alpibus (Norvegia et Lapponia).

δ. AMERICANA. S. cordifolia (*Pursh*), *Hook. l. c. p.* 152, pro parte. In arctica America.

Ab omnibus *S. glaucæ* formis, etiam Pyrenæis, differt trunco subterraneo, ramis subprostratis vel adscendentibus, foliis brevioribus apice obliquo, rigidioribus (ut *S. Myrsinitidem* eo respectu fere simulat), subtus venis elevatis rugulosis, demum glabratis sed margine fere semper ciliatis, amentis laxioribus omnino coetaneis foliis pluribus suffultis, et capsulis distinctius pedicellatis. Iisdem notis a *S. subcordata* recedit: a *S. rhamnifolia* et *S. ovalifolia* foliis utrinque acutis velutinis vel saltem ciliatis, amentis longis et foliatis, capsulis plerumque villosis.

49. S. MYRSINITES (*L.*), *Hook. l. c. p.* 151. — Quum rite extricare nequeo quam speciem ill. Hooker, l. c. potissimum intellecuit, specimina quæ in herbario ejus asservantur et mihi valde dubia restant, describenda puto:

* S. PSEUDO-MYRSINITES, *Anders.:* amentis lateralibus foliis paucis bracteatis erectis elongatis densifloris; capsulis pedicellatis conicis glaberrimis testaceis; stylo distincto; stigmatibus brevibus; pedicello squamam duplo et nectarium quadruplo superante; foliis oblongo-lingulatis breve petiolatis tenuiter membranaceis utrinque glaberrimis, subtus subpallidioribus costa et venis prominulis nervosis crebre et depresse serrulatis.

Hab. "Grand Rapids of the Saskatchawan" et "Rocky Mountains."

Frutex parvus, 1 - 3-pedalis, ramis divaricatis, foliis 1½-pollicaribus vix semipollicem latis (habitu fere *S. Myrsinitidis* nostræ, sed minus coriaceis nec ita venulosis et argute serratis). Amenta (fere ut in *S. phylicifolia*) bipollicaria. Capsulæ testaceæ.

* S. CURTIFLORA, *Anders.:* amentis breve pedunculatis foliis 3 - 4 minutis suffultis erectis brevibus ovatis glaberrimis viridulis; stylo distincto; stigmatibus brevissimis conniventibus; pedicello squamam

atram apice crispato-hirsutam triplo et nectarium parvum quadruplo superante ; foliis anguste ovalibus utrinque glabris exsiccatione nigricantibus margine crenulatis.

Hab. "Fort Franklin, Mackenzie River," *Richardson.*

A vera *S. Myrsinitide* longe distat, habitu potius *S.* (*cordatæ*) *hastatæ* vel immo *S. nigricanti* magis affinis. Fruticulus parvus: rami vix pedales: folia semipollicaria 2 lin. lata, subtus punctis albis creberrimis subpallidiora. Amenta semipollicaria: rhachis puberula: capsulæ minutæ, viridulæ.

50. S. ARBUSCULA, *L.?* S. Myrsinites (*L.*), *Hook. l. c. p.* 151, pro parte.

Formæ quas in "Prince Albert's Land (H. M. S. Investigator)" et "Rae River" (*Dr. Rae*) in herb. Hook. vidi a specie nostra alpina differunt, foliis adhuc angustioribus, squamis amenti apice fuscis, capsulis subtenuioribus, et stigmatibus subsessilibus. Non possum etiam quin ad hanc speciem illam referam formam quam cl. Tuckerman (in *Amer. Jour. Science,* 45, *p.* 35) ut *S. ambiguam,* Ehrh. descripsit (= *S. repens,* herb. Oakes). In Europa ill. Wimmer hanc speciem e *S. repente* et *S. aurita* (quæ forsan in America non inventæ!) prolem hybridam habet. Amentis pedunculatis foliatis, squamis capsulas basi tegentibus flavidis, stylo producto, foliis lingulatis integerrimis, et habitu toto ab omni *S. ambigua* dignoscitur. Ab *S. arbuscula* tamen recedit foliis pilis longis adpressis subtus dense sericeis et integerrimis. Huc etiam referenda:

Var. LABRADORICA: foliis pollicaribus 3 lin. latis costa lata flavescente subtus notatis margine sæpe remote serratis subtus parcissime pilosis. — Labrador.

51. S. RHAMNIFOLIA (*Pall.?*), *Hook. & Arn. Bot. Beech. Voy. p.* 117, *t.* 26; *Ledeb. Fl. Ross.* 3, *p.* 612. S. Uva-Ursi (*Pursh*), *Hook. l. c. p.* 152, pro parte? S. Myrsinites, *Cham. & Schlecht. in Linnæa,* 6, *p.* 540 (ad sinum Sti Laurentii). S. myrtilloides, formæ 1, 2, *Cham. l. c. p.* 539. — Huc forsan etiam pertinet *S. Unalaschensis,* Cham. l. c. p. 541, quæ tamen nostræ *S. hastato-herbaceæ* non dissimilis (sed folia integra!), *S. rhamnifoliam* et *S. ovalifoliam* quodammodo connectit.

Nomen *S. Uva-Ursi,* Pursh, quod in herbario Hook. à Barratt huic speciei etiam impositum est, plane rejiciendum: 1. quod Pursh ipse specimina culta et nunc valde incerta descripsit; 2. quod speciebus pluribus aliis ex "White Mountains of New Hampshire" et Labrador valde recedentibus, fere eodem jure (si mancam diagnosin Purshii respicias) datum fuit. — Cum speciminibus *S. rhamnifoliæ* a Hooker, l. c. primum descriptis et depictis nostra non male congruunt; sed recedunt nonnihil foliis vix spathulato-obovatis margine subintegris, capsulis crassioribus et brevius pedicellatis. Sunt quasi inter *S. Myrsinitidem* (cui capsulis subsimilis) et *S. arbusculam* (cui foliis) disponenda!

52. S. OVALIFOLIA, *Trautv.; Ledeb. Fl. Ross, 3, p.* 620. S. Uva-Ursi, *Seemann, Bot. Voy. Herald. p.* 40. S. myrtilloides, forma 4, *Cham. l. c. p.* 539.

Var. MAJOR: ramis magis elongatis; foliis majoribus elongato-obovatis acutiusculis subtus minus glaucescentibus; amentis fœmineis crassioribus; capsulis majoribus. S. myrtilloides forma 3, *Cham. l. c. p.* 539.

Hab. ad sinum Eschscholtz et Cap. Espenberg (*Chamisso* et *Espenberg*); in insula Sancti Pauli (*Chamisso*); America occidentali-boreali (*Seemann*).

A cæteris facile distinguitur ramis flabellatim procurrentibus, foliis $\frac{1}{2}-\frac{3}{4}$ pollicem longis, vix eadem latitudine, ovalibus vel subrotundis, glabris, rigidiusculis, subtus opace reticulato-venosis, amentis foliis fere duplo brevioribus densifloris, squamis castaneis apice rotundato infuscatis capsulas rufo-piceas glabras attenuatas ad medium tegentibus, stylo distincto, stigmatibus bifidis.

53. S. GLACIALIS, n. sp.: amentis in ramulis annotinis lateralibus foliatis pedunculatis ovato-globosis; capsulis ovatis sericeis sessilibus squamam obovatam vel truncatam duplo superantibus obtusissimis; stylo nullo; stigmatibus bifidis; foliis ovalibus glabris subtus glaucis integerrimis.

Hab. in litore maris glacialis; "between Cape Barrow and Mackenzie River," *Capt. Pullen.*

Hæc species, a Seemann, l. c. *S. Uva-Ursi* etiam subsumta, a priori statim dignoscitur foliis multo minoribus (vix $\frac{1}{4}$ unciam longis vel latis), fere omnino rotundatis, omnino integerrimis, basi latioribus fere subcordatis (quæ etiam in herb. Hook. "*S. myrtilloides*" inscripta), amentis duplo brevioribus, capsulis sericeis, et stigmatibus sessilibus. Radix (truncus subterraneus) latissime repens; rami horizontaliter decumbentes, subdigitales.

II. GLACIALES.

54. S. (RETUSA) PHLEBOPHYLLA, *Anders.* S. retusa (*L.*), *Hook. l. c. p.* 153; *Seemann, l. c. p.* 40.

Forma MAJOR. Folia obovata, integerrima, semiunciam longa, supra medium fere eadem latitudine, supra planiuscula, subtus nervis arcuatis elevatis striata, exsiccatione fusco-viridia: amenta pollicaria densiflora: squamæ parvæ, ciliatæ: capsulæ ovato-conicæ, glaberrimæ, rufæ, pedicellatæ, pedicello squamam parum et nectarium fere duplo superante: stylus pedicelli dimidia longitudine. Hab. in America occidenti-boreali (*Seemann*).

Forma MEDIA. Folia oblonga vel subovalia basi subangustata, semiunciam longa, 3 – 4 lin. lata, nervis elevatis subarcuato-parallelis utrinque costata: amenta semipollicaria, crassa, subclavata: squamæ obovatæ, atræ, longe albo-pilosæ, basin capsulæ attingentes: capsulæ e basi crassa conico-rostratæ, glaberrimæ, rufescenti-sanguineæ, pedicello nectarium vix superante: stylus pedicello longior, tenuis, integer: stigmata bifida, divaricata. Hab. Cap. Mulgrave, *Beechey*. Arctic coast, *Richardson*.

Forma MINOR. Folia ovalia seu oblonga, 2 – 3 lin. longa, nervis rectiusculis parallelis validis percursa (qui nervi, diachymate mox toto evanescente, retis instar soli persistunt): amenta minuta, foliis apicalibus abscondita: capsulæ glaberrimæ, rufescentes, subsessiles, stylo mediocri.

Has tres formas, inter se non parum dissimiles, nullo modo distinguere valeo, quia seriem contiguam a statura majori ad minimam pusillam efficiunt. Est semper fruticulus depressus; ramis ad maximum digitalibus plerumque valde foliatis. A vera *S. retusa*, qualem ex Helvetia bene cognosco, certe quidem nonnihil differt: hæc etiam eandem habet seriem formarum a *S. Kitaibeliana*, Willd. (foliis majoribus) ad *S. serpyllifoliam*, Jacq. (foliis perpusillis) toto habitu consistentia et nervatione foliorum huic nostræ omnino analoga. Forma major maxime ad *S. rhamnifoliam* habitu fruticuli et foliorum accedit, sed differt, amentis exacte terminalibus, foliis nunquam serrulatis adhuc rigidioribus.

55. S. CUTLERI, *Tuckerman in Amer. Jour. Sci.* 45, *p.* 36. S. Uva-Ursi, *J. Carey in Gray, Man. p.* 418.

Forma MAJOR: foliis obovato-ovalibus fere semipollicaribus; amentis pollicaribus.

Forma MINOR: foliis 3 lin. longis adhuc angustioribus oblongis; amentis semipollicaribus.

In speciminibus a me examinatis (et a Tuckermano ipso communicatis) amenta semper terminalia; mascula (quorum stamina singula describuntur) non vidi: nonne ob staturam humillimam et compactam depauperata? Cum *S. retusa* Europæ meridionalis plane nihil commune habet: potius modificatio maxime alpina *S. myrtilloides* (*S. pedicellaris* Amer.) esset judicanda?

56. S. MYRTILLIFOLIA, n. sp.: amentis in ramulis annotinis terminalibus foliis occultatis vix semipollicaribus; capsulis brevissime pedicellatis minutis læte viridibus glaberrimis anguste conicis, pedicello squamam angustam apice nigram glabriusculam subæquante; stylo subnullo facile caduco; stigmatibus brevissimis integris; foliis semiunciam longis 3 lin. latis ovalibus utrinque pallide viridibus et glaberrimis margine crenulato-serrulatis, novellis tenuitate nigrescentibus.

Hab. "Rocky Mountains, east side, in low situations," *Herb. Hook.*

Fruticulus trunco parvo superne ramoso, ramis strictiusculis fere omnino ut in Myrtillo nigro, cui insuper foliis pare viridibus tenuibus margine crenulatis ovali-subrotundis eximie similis.

57. S. RETICULATA, *L.; Hook. Fl. Bor.-Am.* 2, *p.* 151.

Var. *α*. VESTITA (S. vestita, *Pursh; Hook. l. c. p.* 152): foliis subtus pilis longis deciduis sericeis.

Forma GRANDIFOLIA: frutex fere bipedalis; ramis strictissimis; foliis 2 pollices longis supra medium 1½ poll. latis subtus demum omnino glabris; amentis fere bipollicaribus. (Etiam in Siberia.)

Forma PARVIFOLIA: fruticulus, ramis adscendentibus; foliis oblongo-ovalibus subtus densissime albo-sericeis. (Etiam in Helvetia.)

Var. *β*. NORMALIS. S. reticulata, *L.* Qualis in Europæ alpibus vulgaris.

Var. *γ*. NANA (S. nivalis, *Hook. l. c. p.* 152): pygmæa; ramis subdigitalibus; foliis 2 – 4 lin. longis latisque subtus etiam omnino nudis cæsio-albis pulchre venuloso-reticulatis; amentis linearibus e floribus 3 – 6 compositis; squamis obovato-rotundatis glabris venosis. (Etiam in Grœnlandia et Spitzbergen.)

Qui hybridas formas etiam sponte facile procreatas credit formam grandifoliam *S. vestitæ*, s. d. e *S. reticulata* et *S. lanata*, et *S. nivalem*, s. d. e *S. reticulata* et *S. herbacea* ortam conjiciat. Formis innumeris hæ extremæ inter se connexæ nullo modo speciei distingui possunt.

58. S. HERBACEA, *L.; Hook. l. c. p.* 153; *Gray, Man. l. c.*

59. S. POLARIS, *Wahl.; Hook. l. c. p.* 153.

I have omitted from this enumeration the *S. Babylonica*, which is occasionally planted for ornament.

Our list of Willows of North America (exclusive of Mexico, &c.) amounts to fifty-eight species [not counting No. 42, *S. repens*], or rather to fifty-nine, as two are proposed under *S. Myrsinites;* while the Scandinavian species, including almost all the European, probably do not exceed forty-five. These fifty-nine American species, when compared with the European as to their affinities, may be classified into the following five groups: —

I. Those which are common both to the Old and to the New World.

a. Perfectly identical, although more variable in America than in Europe.

1. Transplanted from Europe for cultivation:

S. alba, *S. fragilis*, *S. acutifolia*,
S. viridis, *S. purpurea*, *S. viminalis*.

2. Arctic or Alpine species:

S. vagans, *S. reticulata*, *S. arbuscula*,
S. myrtilloides, *S. herbacea*, *S. polaris*.

b. Having forms very little differing from the European:

(*S. cinerea ?*), *S. glauca*, *S. arctica*,
S. Lapponum, *S. lanata*, *S. alpestris*.

II. Those which, very widely distributed in the middle parts of North America, appear so analogous to European species that they (or at least some of their forms) cannot be definitely distinguished from them, and so may be considered as subspecies:

S. lucida,	analogous to	*S. pentandra*.
S. irrorata,	"	*S. daphnoides*.
S. phylicoides,	"	*S. phylicifolia*.
S. cordata,	"	*S. hastata*.
S. capreoides,	"	*S. Caprea*.
S. phlebophylla,	"	*S. retusa*.

III. Those which differ sufficiently in characters from their European relatives to be considered as distinct species, though belonging to types which in the Old World produce fewer forms:

S. Fendleriana,	related to	*S. pentandra*.
S. Wrightii,	"	*S. alba*.
S. amygdaloides,	"	*S. amygdalina*.

S. eriocephala,	related to	*S. daphnoides.*
S. brachystachys,	"	*S. aurita.*
S. discolor, *S. macrocarpa*,	"	*S. phylicifolia.*
S. Geyeriana,	"	*S. vagans.*
S. humilis, *S. tristis*,	"	*S. repens.*
S. gracilis,	"	*S. rosmarinifolia.*
S. subcordata,	"	*S. glauca.*
S. Pseudo-Myrsinites, *S. curtiflora*,	"	*S. Myrsinites.*
S. Cutleri,	"	*S. myrtilloides ?*

IV. Those which also manifestly represent European types, but with more marked specific differences than those under the preceding head:

S. Bigelovii, *S. lasiolepis*, *S. Coulteri*,	belonging to the type of	*S. daphnoides.*
S. Hookeriana, *S. speciosa*,	" " "	*S. lanata.*
S. candida,	" " "	*S. Lapponum.*
S. Drummondiana,	" " "	*S. laurina.*
S. adenophylla,	" " "	*S. hastata.*
S. Barclayi,	" " "	*S. glauca.*

V. Those which form peculiarly American types:

1. *S. longifolia*, *S. sessilifolia* (* *Hindsiana* and *S. taxifolia*). Correspondents in Europe, *S. riparia* and its allies. To which may be added *S. nigra* and *S. longipes*, belonging to a type peculiar to southern or tropical countries.
2. *S. Sitchensis*, *S. serica* (*grisea*), and *S. petiolaris;* compensations, as it were, in America, for our *Salices mollissimæ* and *repentes.* (*S. angustifolia*, Wulf., is by Wimmer and others regarded as a hybrid of *S. repens* and *S. viminalis.*)
3. *S. rhamnifolia*, *S. ovalifolia*, *S. glacialis*, and *S. myrtillifolia*, — purely arctic forms, corresponding only with species from northern or arctic Siberia.

From all this we gather, that, of the fifty-eight species growing in North America, there are

12 identical with European species.*
6 nearly identical with European species.
6 very analogous to European species.
15 very distinct species, but of European types.
9 species almost peculiar to America.
10 species quite peculiar to America.

If now, on the other hand, we examine the Scandinavian species and types, to ascertain which of them are wanting in America, we find the following, viz.: —

1st. 8 species more or less cultivated throughout Europe, and probably of a more southern origin: *S. undulata*, (*hippophæifolia*,) *rubra*, (*mollissima*,) *lanceolata*, *Smithiana*, (*stipularis*,) (*holosericea*). Four of these (in parentheses) are regarded as hybrids by some botanists.

2d. Only one species indigenous to Scandinavia, where, as in Switzerland, it forms such a multitude of varieties that Schleicher has founded nearly a hundred species upon this one, — viz. *S. nigricans*, a truly European species; of which *S. canescens*, *S. versifolia*, and *S. ambigua* are by many botanists thought to be hybrid forms.

To these may be added from the rest of Europe: *S. Silesiaca*, almost peculiar to Silesia; *S. glabra*, of the Austrian Alps; *S. grandifolia* and *S. Seringiana*, of Switzerland; *S. riparia*, *S. cæsia*, and *S. pedicellata*, in Italy and Spain.

It appears, therefore, that of the 58 North American species, 24 are identical with European ones; 24 belong to the same types; and only 10, western or arctic forms, seem to be peculiar to this great continent: and further, that of the Scandinavian flora only a single indigenous species or type is not yet found in America (a type which appears as if composed of almost every other); while 48 more or less related species or types are common to the New and the Old World, but more luxuriant and varying in America, where we also find a number of other types. All this leads us to look to America as the chief abode, perhaps the original home, of the Willows, and the country where the genus ought to be especially studied. Therefore we may call upon American botanists to apply themselves to the investigation of this genus and its intricate forms, as they have already done to another vast genus (*Carex*) which presents an analogous distribution.

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* Half of these were imported from the Old World, and are cultivated or naturalized, as already stated on p. 75. A. G.

Science, which prefers facts to hypotheses, has not yet sufficient materials to assure us whether, and by what means or in what ways, the original species were first diffused from single centres over distant parts of the earth; but all we know of the arctic and northern regions shows that their vegetation is very homogeneous. This synopsis may help to show, with regard to Willows, that there are many links connecting Europe and America.

[NOTE. — There are about ten species of *Salix* from Oregon and the Rocky Mountains described, and two or three of them figured, in Nuttall's North American Sylva, which remain unknown to Prof. Andersson: all or most of them he may be able to identify, when the volume reaches him, with species enumerated in this Synopsis. A. G.]

Four hundred and fifty-first meeting.

May 11, 1858. — MONTHLY MEETING.

The Academy met at the house of B. A. Gould, Esq.

The PRESIDENT, and afterwards the VICE-PRESIDENT, in the chair.

The Corresponding Secretary read the following letters, viz.: — From the Académie des Sciences, etc. de Dijon, January 18, 1857; Société des Sciences Naturelles de Cherbourg; Det Kongelige Danske Videnskabernes Selskab, June 30, 1857; K. Akademie der Wissenschaften, Wien, August 10, 1857; Royal Society of Sciences, Upsal, October 11, 1857; Société Linnéene de Normandie, November 29, 1857; Trustees of Boston Athenæum, April 10, 1858; and the Boston Society of Natural History, May 1, 1858, acknowledging the receipt of the Academy's publications; — from the Director der Sternwarte, Breslau, October 23, 1857, in acknowledgment of the same, and presenting a work on Climatology; — from the Académie des Sciences de Dijon, January 18, 1857; Det Kongelige Danske Videnskabernes Selskab, June 30, 1857; K. Academie der Wissenschaften, Wien, December 17, 1857; Université Royale de Christiania, November 10, 1857; Nicholas Manzini, Havana, December 10, 1857; and Colonel J.